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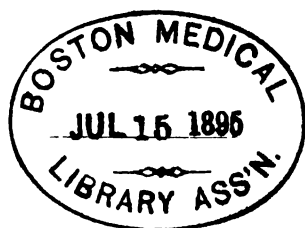
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 SCHOTT, ARNOLD, 1224 N. 7th.
 SCHWEINITZ, GEO. DE, 1330 Spruce.
 SCHWENK, P. N. K., 606 Marshall.
 SEILER, CARL, 1346 Spruce.
 SEISS, RALPH W., 49 N. 17th.
 SELTZER, C. JAY, 22 S. 16th.
 SELTZER, CHAS. M., 608 N. 17th.
 SHAKESPEARE, E. O., 1336 Spruce.
 SHAPLEIGH, ELISHA B., 658 N. 8th.
 SHEETS, JOHN, 1324 Spring Garden.
 SHELLENBERGER, J. R., 4783 German-
 town Ave.
 SHIMWELL, B. T., 1253 S. 17th.
 SHOBER, J. B., Pennsylvania Hospital.
 SHOEMAKER, GEO. E., 3727 Chestnut.
 SHOEMAKER, JOHN V., 1519 Walnut.
 SHRINER, T., 2404 Frankford Ave.
 SIMES, J. HENRY C., 2033 Chestnut.
 SIMSOHN, JOSEPH S., 835 N. 8th.
 SINEXON, JUSTUS, 832 N. 20th.
 SINKLER, WHARTON, 1534 Pine.
 SKILLERN, P. G., 427 S. Broad.
 SKILLERN, SAMUEL R., 3509 Baring.
 SKILLING, M. J., 1702 Christian.
 SLOCUM, HARRIS A., 1208 Spruce.
 SMITH, A. D., 5067 Germantown Ave.
 SMITH, HENRY H., 1800 Spruce.

SMOCK, L. P. 3330 Chestnut.
 SPARKS, GEO. W., 635 Spruce.
 STEINBACH, L. W., 716 Franklin.
 STELWAGON, H. W., 1411 Spruce.
 STERN, MAX J., 711 Franklin.
 STEWART, DAVID D., 2620 N. 5th.
 STEWART, JOHN S., 1617 Arch.
 STEWART, WM. S., 1801 Arch.
 STEWART, W. H., 2436 Germantown Ave.

STILLÉ, ALFRED, 3900 Spruce.
 STOCKER, A. E., 2212 Fitzwater.
 STONE, EDWARD R., 1539 N. 19th.
 STONE, JAMES F., 1806 Green.
 STRAWBRIDGE, GEO., 1500 Walnut.
 STRITMATTER, I. P., 999 N. 6th.
 STROBEL, JOHN. 1134 N. 3d.
 STUBBS, G. EASTMANN, 1616 Walnut.
 STYER, C., 2201 Columbia Ave.
 SUDDUTH, W. XAVIER, 1725 Arch.

TAYLOR, J. MADISON, 331 S. 16th.
 TAYLOR, WM. J., 331 S. 16th.
 TAYLOR, WM. L., 1440 N. 12th.
 THOMAS, CHAS H., 1807 Chestnut.
 THOMAS, FRANK W., Mount Airy.
 THOMSON, WM., 1426 Walnut.
 TRAUTMANN, B., 520 N. 4th.
 TREACY, DENNIS J., 1914 Christian.
 TROTH, SAMUEL W., 1200 N. 7th.
 TROTTER, SPENCER, 223 S. 18th.
 TULL, M. G., 4807 Woodland Ave.
 TURNBULL, CHAS. S., 1719 Chestnut.
 TURNBULL, L., 1502 Walnut.
 TURNER, JOHN B., 724 S. 16th.
 TYSON, JAMES, 1506 Spruce.

VANDERSLICE, E. S., 127 S. 5th.
 VANDYKE, EDWARD B., 306 S. 10th.
 VAN HARLINGEN, A., 118 S. 17th.
 VOGLER, GEO. W., 565 N. 5th.

WALK, JAMES W., 737 Corinthian Av.
 WALKER, JAMES B., 1617 Green.
 WARD, E. TILLSON, 843 S. 3d.

WATSON, ARTHUR W., 162 N. 20th.
 WATSON, EDW. W., 131 N. 20th.
 WAUGH, WM. F., 1725 Arch.
 WEBB, WM. H., 556 N. 16th.
 WEED, CHAS. L., 1804 Green.
 WELCH, WM. M., 821 N. Broad.
 WELLS, J. R., 5138 Lancaster Ave.
 WHARTON, H. R. 1405 Locust.
 WHARTON, R. S., 1006 Walnut.
 WHEELER, E. B., 1926 N. 8th.
 WHELEN, ALFRED, 123 S. 20th.
 WHITE, J. W., 1810 S. Rittenhouse Sq.
 WHITESIDE, J. E., 6603 Haverf'd Av.
 WIEHLE, C. A. MAX, 319 N. 37th.
 WIGHTMAN, J. G., 1639 Race.
 WILEY, EUGENE, 330 Reed.
 WILLARD, DE F., 1818 Chestnut.
 WILLIAMS, HORACE, 1717 Pine.
 WILLITS, CHAS. H., 1839 Arch.
 WILLITS, I. P., 5123 Germant'n Ave.
 WILLITS, MARY, 1527 Green.
 WILSON, B. B., 1903 Chestnut.
 WILSON, C. MEIGS, 121 S. 17th.
 WILSON, ELLWOOD, 1517 Walnut.
 WILSON, H. AUGUSTUS, 1611 Spruce.
 WILSON, JAMES C., 1437 Walnut.
 WILSON, JAMES F., 1010 Race.
 WIRGMAN, CHAS., 2005 Pine.
 WISE, GEO. G., 424 S. Broad.
 WITTIG, CHAS. F., 450 N. 4th.
 WOLFF, LAWRENCE, 333 S. 12th.
 WOLFORD, W. S., 1310 Walnut.
 WOOD, HORATIO C., 1925 Chestnut.
 WOODBURY, FRANK, 218 S. 16th.
 WOODS, D. F., 1501 Spruce.

YARD, JOHN L., 659 N. 12th.
 YARROW, THOMAS J., 1335 N. Broad.
 YOUNG, I. G. 1000 Shackamaxon.
 YOUNG, J. K., 224 S. 16th.

ZIEGLER, GEO. J., 123 Richmond.
 ZIEGLER, W. M. L., 1418 N. 17th.
 ZIEGLER, WM. H., 2710 Richmond.
 ZUILL, W. L., 1925 Race.

DECEASED MEMBERS.

WILLIAM ASHMEAD.	Died February 3, 1888.
JOHN FOULKROD.	Died January 6, 1889.
JOHN L. LUDLOW.	Died January 6, 1888.
CHRISTOPHER H. MILLER.	Died January 11, 1889.
J. HENRY SMALTZ.	Died Sept. 22, 1888.
J. H. WEHNER.	Died July 31, 1888.

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ANNUAL ADDRESS OF THE PRESIDENT OF THE SOCIETY.

By J. SOLIS-COHEN, M.D.

[Delivered at the business meeting, January 18, 1888.]

GENTLEMEN : In complying with that clause of our By-Laws which demands from the President of the Society an address at the close of his official term, let me, in the first place, express to you individually and collectively my cordial appreciation of the uniform courtesy of which I have been the grateful recipient alike in the chair and out of it.

The position of presiding officer of one of the largest, most reputable, intelligent, and influential medical societies of the United States is a position to be proud of; and one, the occupancy of which, even for a single term, must furnish a continuous source of gratification for the remainder of one's life.

Our active membership now numbers 504, with several propositions awaiting endorsement. During the past official year we have acquired thirty-one new members and have lost twenty-six, four by resignation, eleven by removal from the city and by failure to comply with the requirements of our By-Laws, and eleven by death; among the latter Dr. Nathan D. Hatfield, President when I signed the Constitution of the Society, in 1865, and Dr. William Terry Taylor, my colleague as Vice-President in 1877.

The record of those lost by death is as follows :

Date.	Name.	Graduate of	Date of membership.
Jan. 4, 1887,	Nathan Hatfield,	Jefferson Medical College, 1865,	Jan. 1868.
Feb. 16, 1887,	R. M. McClellan,	Jefferson Medical College, 1879,	June, 1881.
Feb. 17, 1887,	Wm. S. Little,	Bellevue Hospital Medical College, N. Y., 1873,	Oct. 1880.
March 2, 1887,	Wm. Terry Taylor, ¹	University of Pennsylvania, 1848,	Oct. 1870.
March 13, 1887,	Austin Flint, of N.Y. (Honorary.)	Harvard Medical School, 1883,	Oct. 1883.
May 9, 1887,	Elliot Richardson,	University of Pennsylvania, 1867,	Jan. 1881.
May 13, 1887,	Wm. Harkins Fox,	Jefferson Medical College, 1882,	Oct. 1885.

¹ Vice-President in 1877.

	Date.	Name.	Graduate of	Date of membership.
May	25, 1887,	Edgar P. Jefferis,	University of Pennsylvania, 1878,	April, 1882.
July	14, 1887,	David Davidson,	University of Pennsylvania, 1871,	Oct. 1878.
Aug.	21, 1887,	N. Archer Randolph,	University of Pennsylvania, 1882,	April, 1886.
Aug.	30, 1887,	Nathan L. Hatfield, ¹	Jefferson Medical College, 1826,	Jan. 1850.
Nov.	29, 1887,	Henry D. Harvey,	University of Pennsylvania, 1878,	June, 1880.

Memorial notices have been promised of several of these deceased members; and when they have been prepared, a special meeting will be called for the express purpose of listening to them; a plan which will avoid interruption or curtailment in the routine of our regular meetings for scientific or for business purposes. Of the original fifty-seven founders of the Society in 1849 but three remain: the venerable Dr. William Ashmead,² of Germantown; Dr. Alfred Stillé; and Dr. Richard J. Levis, my immediate predecessor in the chair. Of the one hundred and forty-eight members at the time of my own admission in 1865, so many familiar faces have faded in death that an effort is sometimes required to feel assured that this is the same old County Medical Society which for so long played such a prominent part in directing the medical policy of the state and of the nation. Not only has the Society altered much in personal features, but it has altered much in the matters and manners of its scientific work. Then a young man rarely participated in debate and rarely presented a paper based on original research or on personal observation. Oftener would he report a case of interest or of rarity, with or without statistical references as might be; or open a subject largely with quotations from the authors of text-books and of monographs. The discussions then, as now, formed an essential feature of the proceedings at conversational meetings, and sometimes there were opposing champions of theories present, ready to pit themselves against each other whenever the subject discussed led to choice between pet speculations on irritation, on secretion, on elimination, or on what not.

Therapeutics had barely begun to free itself from the pharmaceutic loads long before impressed upon medical practice in the United States by the example of a large class of British practitioners whose legal status seemed to compel too much prescription in order to secure adequate pecuniary remuneration for professional services; and too much stress was often laid upon the special value of special prescriptions advocated by various observers under various conditions. The medicine of that day was still largely theoretic, conjectural and empirical.

¹ President in 1866.

² Dr. Ashmead died Feb. 2d, aged eighty-seven years.

The graduate of a few years' standing was rarely prepared to advance theories, to support or to combat them ; he had not become skilful in conjecturing causes to account for varying phases in the course of maladies ; while practice was still so hard to secure, that he who had no hospital or dispensary appointment had little opportunity to acquire knowledge by empiricism, or even by accident. Hence the comparative reticence of the modest young physician at our conversational meetings of more than twenty years ago.

When, however, the gradual admission into our schools of methods of instruction more and more practical in their relations to the study of disease and to the comprehension of its treatment, led to educating the mind of the student rather than to exercising his memory, substantial results justified the continuance and enlargement of the plan ; and now the average recent graduate, when he comes in contact with disease on his own account, understands better what is before him than did the average recent graduate of only a quarter of a century ago. Some of the time then actually lost, if not wasted, in hearing or conning masses of verbiage now discarded and largely relegated to historical treatises for consultation as desired, is usefully employed in personal work in the physical, physiological, histological, pathological, chemical, or therapeutical laboratory ; so that the student gains some practical notions of the objects upon which he is to work and of the materials with which his work is to be performed. In the classroom, the stethoscope, ophthalmoscope, otoscope, laryngoscope, and similar instruments of precision in observation, have been utilized to teach him to see and to hear for himself rather than to depend exclusively upon the opinions of his teacher and on those published in his textbooks. The microscope, the thermometer, the exploring needle, the chemical test and other appliances for control in observation, have taught him how to avoid mistakes often inseparable from too great a reliance upon mere gross appearances ; while they supply him with accurate methods for detecting pathologic departures from health at the earliest available opportunity. He is more carefully instructed in the details of operative interference, and is taught to avoid that carelessness of person and of appliance which recent experience has shown to have been the most prolific source of failure in the immediate results of many important surgical operations. These practical studies, and others of like character, including the studies of dietetics, of sepsis, and of infection, have led to changes in professional opinions that in some instances have amounted to complete reversals ; and even the well known but illy comprehended beneficent effects of certain

methods of treatment with drugs, with diet, with electricity, with heat and with exercise, have proven to be based upon principles and properties far different from those which were formerly ascribed to these agencies.

Thus the young physician's means of diagnosis are no longer limited to hearsay and to empiric observation. His cognizance of facts in medical science, and of the natural laws governing the inception of diseases and their progress, enables him to approach patients with an air of confidence derived from actual knowledge of the principles of medicine, rather than with that air of assumption of familiarity with disease which was its frequent substitute when the secrets of departures from physiological states of health were more enveloped in clouds of theoretical speculations.

Hence, in meetings of medical societies, when theories are advanced which, despite their prevalence and their authorities, are clearly at variance with recently discovered facts, the young man who knows better is tempted to rise and explain; and if his remarks are delivered with becoming deference, and the information tendered bears the stamp of certitude, his advent into medical debate is received by his seniors with a quiet appreciation which not only encourages him to present some subject himself ere long, in the light of modern revelations, but insures him an intelligent and sympathetic audience.

Better prepared than were their predecessors, recent graduates are not so long in becoming known as prominent physicians; and practice is acquired by them far more rapidly than used to be the fashion.

Our young men, too, are being called upon more and more frequently by their seniors to help clear up some obscure features in cases which may require familiarity in the use of modern appliances of precision, or of control, and thus they steadily gain a legitimate professional good repute which has a very beneficial influence on their career; and that, without any undue effort on their part to force themselves upon the attention of the profession, or upon that of the public. This is largely the class of men whose utterances have become more and more familiar in our society during the period referred to, and to whose ranks additions are accruing from time to time, to replace the thinning files of older men—those who keep abreast with modern research, and those to whom much study has become a burden—as they withdraw from active participation in our meetings, or become too tired to attend when not brought out by some subject in which they feel exceptional interest.

Advances in treatment closely follow advances in diagnosis, in the natural philosophy of disease, and in prognosis. These advances and

changes are duly recorded in the papers brought before us, and in the discussions they elicit. Here, too, theory has largely fallen back before fact, until by the course of natural selection, mere speculation is now well nigh banished from our deliberations. Hence the practical character of our scientific work, which is gradually and steadily increasing in importance, as may be seen by reference to our published transactions; of which it may be safely said that they do not compare unfavorably with similar publications of sister societies, and that those of the year just closed show no deterioration in character of subjects or in methods of comment.

Honor where honor is due. Much of this societary success of later years is attributable to the admirable plan adopted under the presidency of Dr. Welch, whose interest in the society has not subsided since the election of his successors. By this plan, members were personally requested to take part in the discussion of subjects upon which they were known to be well informed, and were furnished in advance, whenever practicable, with abstracts of the line of argument which would characterize the papers to be discussed.

During the last year two very valuable scientific discussions were due severally to the interest taken for the purpose by the Chairman of the Committee on Obstetrics and Gynecology, and on Clinical Pathology, respectively, and to whom it is proper to make this thankful reference. The success on the evenings referred to, in attendance, and in interest in the subjects presented, should induce the Directors to take similar measures to secure three or four equally valuable meetings every year.

It is to be deplored, on the score of professional ethics, that mention of some of our scientific work is occasionally noted unofficially in the public newspapers, despite the express interdiction in our By-laws. Whether this prohibitory clause be deemed judicious or not, it is plainly the duty of all members to accede to its behests. Those who disapprove of it should present their reasons for so doing in full meeting and should endeavor to have it rescinded. They have neither the right to ignore it on the one hand, nor the right to disobey it on the other. On several occasions when reporters of the daily press have been present at our meetings they have assured me that they were present on invitation of a member; that they had no desire to intrude, and had believed that their presence would be agreeable to the Society. This subject leads me to offer a few remarks upon certain relations of the profession to the public. While there is no reason to doubt that much of the individual editorial advertisement of subjects

discussed or to be discussed at societies, or of operations performed or to be performed in public places or in private, is due to officiousness on the part of a student, a follower, an attendant, or a patient; there is equally good reason to believe that most of it is courted, directly or indirectly, by the individual most interested. Of this fact I have been amply assured by newspaper men who have been my own patients, and to whom I have put the question direct. I have been assured, further, that it could be taken for granted that little matter of personal medical importance ever gains access to the papers without the knowledge of those most intimately concerned. On the other hand, it is equally true that matters of some immediate momentary interest to the public do not always reach the newspapers, even when passing through the mails in hundreds of notices openly printed upon postal cards.

While it is gratifying to believe that this itch after newspaper notice may be much less prevalent in Philadelphia than in some other localities, the hope is to be indulged that it may eventually become entirely extinguished. The disease at present is in great measure a mere matter of taste—quite poor taste, according to the ethics of the Philadelphia County Medical Society.

One custom in which the ordinary conduct of the physicians of Philadelphia is to be commended, in their relations to the public, consists in their unwillingness to cater to gratifications of the morbid appetite of the newspaper public for tattle as to the nature of the diseases with which some of their distinguished patients may be afflicted; and as to the prospects of their death or survival. Propriety indicates that such inquiries should be referred to the patient if he be in a responsible condition; or, if otherwise, to that member of the family upon whom the responsibility has devolved. The confidential relations of a patient to his physician should remain undisturbed even when the patient is no longer competent to withdraw his confidence, and no communications presumptively disagreeable to him in his senses, should be furnished for press gossip without the consent of those who are most immediately interested. The pleasure derived by an invalid from the daily perusal of his favorite newspaper is often exceedingly great; far greater than when, under the press of affairs, he read chiefly headings and telegraphic items. He reads it much more thoroughly, sometimes even to the advertisements. As he reads day by day, of what is going on in the great world outside, his little world of bedroom life seems somewhat less constricted. Let us avoid curtailing

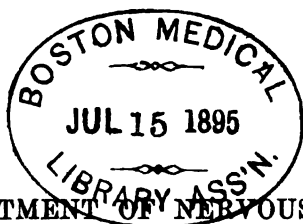
his gratification by acts of ours. If his newspaper cannot be taken up without a dread of seeing some paragraph discussing the nature of his malady and the prospects of his early demise, this innocent source of enjoyment is poisoned for him. He must rest content with a mutilated paper, the very gaps in which are repulsively suggestive, or he must consent to have it read to him, or give it up altogether and thus become deprived of taking interest in many things outside of his own illness. It is hard enough for him to fear or to know that his malady is incurable, without having the fact forced upon his attention at some comparatively happy moment when it is out of his thoughts. Harder still, perhaps, to steel himself into indifference.

It is unnecessary to mention examples. They must be familiar enough. In some instances there has been abundant reason to believe that death has been hastened by thoughtless comments in newspapers. Shall the individual always be sacrificed to the multitude? It has been stated that occasionally, when potentates or very wealthy individuals have been the subjects of these items, special copies of newspapers have been printed for their use, in which the objectionable personal passages of the general edition have been replaced with other matter. But there is little hope that the sores of the afflicted shall not be exposed to public gaze, unless their own physicians protect them by the charity of their reticence. The public maw is so rapacious, that the average newspaper man dares not deprive it of any tidbit, however unfit the food, and, worse than the cannibal who sometimes kills the sick man that his people may devour him, the editor sometimes delivers the sick man to his readers that they may devour him even while he is dying.

Our relations to each other remain in a very satisfactory condition, as evinced by the harmoniousness of thought and of action in the routine business of the Society and in such special business as is presented from time to time.

The additions to our membership, while large, are hardly commensurate with the number of physicians in the city. Increase should be encouraged not only by seeking the accession of those who are in high repute as to their realization of their obligations to each other and to their profession, but by intimation to those whose very association with us we feel would be all they would require to learn those unwritten duties and to live up to them, that any desire on their part to join our numbers would be met with the respectful consideration of our Board of Censors.

In concluding, it but voices the sentiment of the Society at large to bespeak for the coming year continued interest in matters of medical science and medical polity, so that the Philadelphia County Medical Society may be universally regarded as one of the best models for furthering the promotion of medical knowledge and the spread of medical ethics.



THE TREATMENT OF NERVOUS AND MENTAL
DISEASE BY SYSTEMATIZED ACTIVE
EXERCISES.

By CHARLES K. MILLS, M.D.,

PROFESSOR OF DISEASES OF THE MIND AND NERVOUS SYSTEM IN THE PHILADELPHIA POLYCLINIC,
NEUROLOGIST TO THE PHILADELPHIA HOSPITAL; LECTURER ON MENTAL DISEASES
IN THE UNIVERSITY OF PENNSYLVANIA.

[Read January 11, 1888.]

EXERCISES or movements for medical purposes—medical gymnastics, in other words—have been divided and subdivided to an absurd degree by Ling and his followers. Schreiber gives an example of a German term for what is called the quarternary combination of the standing position, which term contains forty-five letters and nine different words, although it is written in German as a single word. The division, however, into such movements or exercises as passive, duplicated active, and active, is rational and useful. Passive movements are performed upon the patient or individual, his will not coming into play except in submitting. In duplicated active movements, both the operator and the individual treated, take part; the first resisting while the second acts, or the reverse. Sometimes these movements are spoken of as semi-active and semi-passive; in the former, the physician or operator resists; in the latter, the subject resists. Movements of this class are of the greatest value in some forms of nervous or neuro-muscular disease, but it is not my purpose to discuss them, unless it be incidentally, in this paper; nor do I intend, except perhaps in the same manner, to speak of massage.

It is of systematized active exercises, that I will more particularly speak. The expression single active movement indicates that the movement is performed by a single individual without direct assistance, although it may be done under the orders of a physician or master. Exercise of this kind may be performed either with or without apparatus, and even when the latter is used it need not necessarily be expensive. While massage and electricity have received a large share of attention from neurologists, they have neglected too much the use

of medical gymnastics, particularly systematized active exercises. Masseurs and masseuses, good, bad, and indifferent, now abound in our large cities, but good instructors in physical culture, as applied to medical purposes, are not numerous.

"Gymnastics," "exercises," and "movements," by some medical writers are used as practically synonymous. Dr. George H. Taylor, however, claims that we should carefully distinguish between gymnastics and movements, and between calisthenics and movements, and that evil has grown out of confounding these terms. It is probably better in a medical paper to speak with precision of "movements" or "exercises," designating the particular kind, but "medical gymnastics" covers the whole ground, and the word "gymnastic," or "gymnastics," used in a general sense, may be properly employed in medicine.

I will not give much space to a discussion of literature, but will refer briefly to a few important publications, including those which I have chiefly consulted in the preparation of this paper.

The attention of the profession of this country has been too little attracted to the publications, and the practical work of the brothers, Dr. George H. Taylor and Dr. Charles Fayette Taylor, of New York, who may be regarded as the pioneers in this country of the gymnastic treatment of disease. They deserve great credit for their efforts, not wholly appreciated. As early as 1861 a book was issued on *The Theory and Practice of the Movement Cure*, by Charles Fayette Taylor, M.D., in which is discussed in an interesting and practical way the treatment, by Swedish movements, of curvatures, paralysis, indigestion, constipation, diseases of women, etc. In 1879 appeared a Treatise entitled *An Exposition of the Swedish Movement Cure*, etc., by George H. Taylor, A.M., M.D. Dr. Benjamin Lee, of Philadelphia, by his practical labors, and his publications on massage and Swedish movements, has done much to advance the cause of mechanotherapy in America, and stands with the Taylors as a pioneer in this department.

Archibald Maclaren's *System of Physical Education, Theoretical and Practical*, is an invaluable book, and while not intended for medical purposes should be studied by every physician interested in active exercises as a means of treatment. Blaikie says truly of Maclaren, that he has done more than anyone else now living to point out the benefits resulting from rational physical exercise, and how to attain these benefits. By his individual efforts and his publications, William Blaikie himself has also done a great work for the advancement of physical culture. His book published by Harper & Bros.,

in 1883, and entitled *How to Get Strong, and How to Stay So*, has enlisted the interest of thousands, and doubtless has lengthened or saved many a life. In 1886 appeared another little work by Blaikie, in the form of a school text-book: *Sound Bodies for Our Boys and Girls*. The exercises given in this book are clear and plain; they are arranged on a natural plan; they are safe, and but little apparatus is required for them—a few dumb-bells, a few wands or sticks, and a horizontal bar, are about all. I have found them to be admirably suited for my purpose in the treatment of some forms of nervous and mental disease.

In the *Therapeutic Gazette* for June and July, 1887, appeared two lectures by Prof. Dujardin-Beaumetz, of Paris, in the first of which he considers the physiological effects obtained from exercise and movements; and in the second, after setting forth the methods of medical gymnastics, he discusses the diseases and conditions in which they are useful.

A Manual of Treatment by Massage and Methodical Muscle Exercise, by Joseph Schreiber, M.D., of Austria, translated, with the author's permission, by Walter Mendelson, M.D., of New York, has appeared within a few months. This book treats the subject of mechano-therapy from various points of view; and in it are found explicit directions in regard to the technique of massage and its effects, and also a discussion of active movements with and without apparatus. The treatment of many nervous diseases is discussed. The book is a valuable practical treatise, and its publication will do much to advance mechano-therapy in this country; but one of my chief reasons for referring to it is because it contains an extensive chronological bibliography, which can be consulted by those interested.

I am engaged in the preparation of a book on the *Gymnastic Treatment of Nervous and Mental Diseases*, in which will be considered both general and local methods of exercise, and the combination of such methods with other forms of treatment, as, for instance, with massage, electricity, hydrotherapy, and medicines.

One of my chief purposes this evening is to call attention to general systematized active exercise. I will also speak of a few special or local exercises designed for particular organs or parts. In a large number of nervous and mental cases, the improvement of general nutrition is the one thing needed to bring about relief or cure, and one of the most effective aids to this end is general, systematized active exercise. The methods chiefly adopted by me are (1) the exercises of Blaikie, with or without dumb-bells, and with the horizontal and

parallel bars, or substitutes for them; and (2) exercises with pulley-weight apparatus.

I need only refer you to Mr. Blaikie's¹ best known book for a description of some of the simplest forms of apparatus; to the uses which can be made of the jambs of a door and a couple of pitchfork handles, and for the sketch of a pair of pulley-weights of excellent pattern designed by Dr. Sargent.

A. J. Reach & Co., of Philadelphia, the well-known dealers in sporting and gymnastic goods, have constructed a form of pulley-weight apparatus, which is very complete, compact, and convenient.

"The Home Exerciser" of C. L. Dowd, of New York, is also convenient and useful, and has been strongly endorsed by Mr. Blaikie for its compactness, strength, lightness, etc. The apparatus of Reach and Dowd consists of an arrangement of ropes, pulleys, and weights, ingeniously put together so as to occupy but little room, and yet to allow the performance of many movements.

"The Home Gymnasium" of John E. Ruebsam, of Washington, D.C., is well adapted to the office of a physician, or to hospitals and colleges. For a long time I have had this apparatus in use. It occupies more room than the apparatus of Reach or Dowd, but, on the other hand, it is in some respects more complete, having, for instance, combined with it a lounge for massage purposes, and a strong horizontal bar. An apparatus of this kind or one similar should be in every hospital which has not a complete gymnasium.

Elastic straps are sometimes used for gymnastic purposes. According to Dujardin-Beaumetz, Pichery was the originator of this system, which he has styled "opposition gymnastics." Elastic cords with handles attached are firmly fastened in convenient places. By making tractions in different directions, they will bring out almost any muscular action. They can be adapted to the leg or foot movements, as well as to the upper extremities. Some objections, however, apply to them which are not applicable to the pulley-weight apparatus, or to the use of dumb-bells, bar-bells, etc. The force used cannot be thoroughly controlled and regulated. Blaikie,² in describing and criticising one of the forms of parlor-rowing apparatus, has pointed out their defects and shortcomings better than can be done by myself. In spite of their defects, however, he considers them excellent contrivances, if used intelligently.

Movement apparatus run by steam has been largely resorted to in

¹ How to Get Strong, etc.

² Op. cit., p. 101.

some countries, particularly in Sweden, where the method was invented and introduced by Zander. In this country, it has been used in a few institutions, as at the Surgical Institute, formerly located at Broad and Arch Streets, in Philadelphia, where I have observed its workings. The system has a field of usefulness; it has also certain disadvantages, and needs the most careful supervision, but under the strictest supervision it may be used with great benefit. To some extent, semi-active and semi-passive or duplicated active movements may be carried out by this machinery, and it can be made to cover the whole range of passive exercises.

The same cautions and contraindications are to be borne in mind in using the exercises either with or without apparatus: probably the dangers of overdoing are to some extent greater with than without apparatus. In the prolonged treatment of patients, some advantages accrue from the use, conjointly or alternately, of exercises with and without apparatus. The interest of variety is added, and the opportunities for the adaptation of movements to special cases and conditions are more numerous. Most of the firms which sell pulley-weight apparatus send with them printed instructions and illustrations; but I must enter a word of caution against the employment of such apparatus by invalids without special medical supervision. Much harm has come to individuals, as well as to the subject of medical gymnastics, by the use of exercises without specific directions.

To a considerable extent, I have personally directed the exercise-treatment of my patients in private practice, and in the nervous wards and the insane department of the Philadelphia Hospital. Dr. A. H. P. Leuf, instructor in physical culture in the University of Pennsylvania, and Dr. O. H. Beckman and Dr. Mary Willits, assistants in the department of the mind and nervous system in the Philadelphia Polyclinic, have, under my instructions, successfully treated patients for me.

Mr. Clinton A. Dodge, of Philadelphia, is an able and experienced instructor and expert in gymnastics. During the present year he has treated for me, with marked success in most cases, patients suffering from neurasthenia, hysteria, habit chorea, neuritis, lateral spinal curvature, melancholia, etc. Mr. Dodge has also had under his charge the patients of other physicians, and, by their permission, he has given me some of the results of his work.

The director of these exercises should be thoroughly well fitted for his work. He should not only understand the work, but he should combine discretion with enthusiasm in pursuing it. If not a

physician, or if a physician without special experience in such work, the treatment should be carefully supervised by some one more competent. The treatment should be carefully individualized. The instructor or director should not undertake too much in one day; and he will soon tire and do badly with his patients if he cannot become interested.

Usually I combine respiratory exercises with the muscular movements. "On the two powers, muscular and respiratory," say Mac-laren, "depends the ability to perform all bodily exercises." Inherent nervous force has also something to do with the capacity to perform bodily exercise.

Of course, in any method of gymnastics, respiration must to some extent be exercised. Breathing becomes accelerated, and even painful, under continuous active exercise. In speaking of respiratory gymnastics in this connection, however, I refer to special efforts of breathing—by taking deep, full breaths through the nose and mouth; by forced expiration, as well as inspiration; by counting with a loud voice while holding the breath, etc. It is not my purpose to refer in this paper to the use of pneumatic chambers or other forms of pneumatic apparatus.

It is interesting to recall that the most ancient of books in which gymnastics is discussed, the Chinese treatise *Cong-Fou, the Art of Mun*, speaks particularly of the importance of respiratory gymnastics. Dally and others, in the present century, have maintained that respiration is the pivot of every gymnastic exercise, and systems of respiratory gymnastics have been invented (Dujardin-Beaumetz).

Want of respiratory power is certainly either at the root, or is an essential constituent of many morbid nervous conditions. It is remarkable how much individuals differ with reference to their respiratory power, even when of apparently the same muscular ability. The development of the lungs, chest walls, diaphragm, abdominal walls, and other parts; the greater aëration of the blood which is conveyed to weak spinal or encephalic centres; the greater control which the patients obtain over all nervous and muscular effort through these respiratory exercises, make them of decided value in cases in which active movements are applicable. On the other hand, it is quite possible that some harm may result from the incautious use of forced respiration. Carried on too long, both as far as giving lessons is concerned, and as far as the weeks and months during which the exercises are continued, it is even conceivable that the air-cells may be unduly strained. Great care should be taken with those who are very weak

generally or in a particular part, especially in the lungs or abdominal region.

The treatment should begin with the simplest forms of exercise, and these should be constantly increased and elaborated, as the patients gain in skill and strength. It is wonderful how little some patients can do in this direction. A grasshopper in gymnastics is a burden to them. Five minutes or even less, is sometimes all the time that can be safely taken at first, and five minutes of actual exercise must sometimes be distributed over half an hour. In most cases the time should never be allowed to exceed twenty to thirty minutes. Often it is important to give resting spells during the process of treatment. Some patients, ambitious to excel or fearing to appear weak, will certainly overdo. Individual peculiarities should be carefully studied. In the majority of cases of nervous and mental diseases in which systematized active exercises are indicated, the danger will be greater of overdoing than of doing too little.

It is an important practical matter to have the air of the room in which the exercises are performed as pure as possible. The room should be well ventilated. It is not necessary, particularly in the case of the nervous and weak, that the room should be without fire, indeed, it is sometimes better that there should be some warmth, but fresh air should be admitted to the room.

Carrying out strictly hygiene in various directions will very much assist in getting good results with the exercises. When possible, it is well for the patient soon after finishing the exercises to take a sponge-bath, with tepid or cold water, according to individual vigor. Good food, regulated exercise in the open air, and plenty of sleep are, of course, important.

To illustrate clearly what is meant by simple respiratory exercises in connection with systematized muscular movements, I will quote for you from Blaikie's smaller work two of his very plain directions. I will also quote from the lectures of Dujardin-Beaumetz, one of Dally's movements.

"Directions.—1. Stand four feet apart in the aisles, with arms folded behind you, and with one foot about eight inches in front of the other. 2. Now draw the head back and tip it as far down behind as you can. 3. Hold the chin up high. 4. Rest there a moment, then stand up straight again. 5. Repeat this exercise six times.

"Caution.—Breathe deep, full breaths all the time; indeed, always, when exercising, breathe slowly, and as large breaths as you can."

1. Take a dumb-bell in your right hand and hold it up high over your head. 2. Stand with the chin up high all the time. 3. Breathe a full, deep, slow

breath. 4. Now slowly lower the dumb-bell, not down to your right shoulder, but across, above your head, and down over your left shoulder, as low as you can, till it touches your shoulder, letting your body tip over to the left. 2. Hold it there till you slowly count ten. 6. Now bring it back overhead again. Then do the same with the dumb-bell in your left hand. 7. Do this five times with each hand.

Repeat this five times each day the first week, and twelve times daily after that right along.

One of Dally's respiratory exercises is as follows: he places the patient in a vertical attitude with the back against a wall, then, both arms being extended horizontally in front, the patient forcibly and slowly separates the fingers while he bends the thorax forward; he remains in this position thirty seconds, makes a deep nasal inspiration, and resumes the initial position, then makes a deep expiration, and repeats this exercise six times in succession.

Dujardin-Beaumetz, in reference to these exercises of Dally, remarks that another and simpler exercise will render much service in developing respiratory capacity, viz.: to make the patient count with a loud voice as long as he can without losing breath. Before commencing to count he should make a deep nasal inspiration.

Among the diseases of the nervous system referred to by Dujardin-Beaumetz as calling for gymnastic treatment, are muscular atrophies, deformities, chorea, hysteria; ataxic, nervous, and neurasthenic persons; the victims of mental overwork and sedentary life, and idiocy. He also discusses the uric acid diathesis, gout, and diabetes, for which neurologists are often consulted.

This paper is not founded simply upon theoretical considerations and a study of literature. For several years I have to some extent used systematized active exercises, either with or without apparatus, and during a year past I have had a considerable number of patients on this treatment. My objects, in addition to recording experience, are to call general attention to a too much neglected method of treatment, and to make certain practical suggestions which naturally grow out of a study of the subject. It will be impossible to give details of cases without dragging the paper to a wearisome length. When preparing this paper I was able to put my hands on forty-four such cases, not including those under treatment at the Philadelphia Hospital. Of these cases, twenty-five were treated by the general active exercises, some with and some without pulley-weight apparatus; the other nineteen by some local method for a special purpose. The patients treated by the general exercises included cases of idiocy, insanity, asthma,

minor chorea, habit chorea, hysteria, general nervousness, neurasthenia, nervous palpitations, lithæmia, cerebral syphilis, diabetes, curvatures, ataxias, and paralyses; those treated by special more or less local methods included cases of hemiplegia or monoplegia, infantile paralysis, lead paralysis, rheumatic neuritis, muscular atrophy, aphonia, and writer's or telegrapher's disease.

For the feeble-minded, for the insane, and even for criminals, systematized active exercises can be used with great advantage. Those in charge of institutions for the idiotic and feeble-minded in France have in particular given much attention to gymnastics. It is only necessary to recall such names as Esquirol, Bourneville, and Pichery. At the Pennsylvania Training School for Feeble-minded, at Elwyn, in charge of Dr. I. N. Kerlin, I have frequently, and with great interest and pleasure, witnessed the performances of the gymnastic classes. As many as eight separate classes are instructed at one time by as many teachers; and at intervals general exhibitions are given. The classes are graded from those pupils who can perform only the simplest movements, up to those capable of elaborate and somewhat difficult exercises. At Barre, Massachusetts, a gymnasium has been erected, and the children are thoroughly drilled and taught. The same is true of some other institutions for the idiotic and feeble-minded in this country. Much could be said, if time permitted, about the beneficial effects of regulated physical culture in idiocy. For the improvement of the general nutrition of a class of unfortunates, usually deficient in this respect, as well as for their training and development, both mental and physical, systematic exercises are of the utmost value. In some of the grades of idiocy attention should be paid to individualizing the treatment by exercise. To a certain extent gymnastics can be used for diagnostic and prognostic purposes in idiocy, observation of those attempting systematized exercises determining the possibilities as to general improvement.

So far as I know, very little has been done with systematized movements in hospitals and asylums for the insane, although I believe insanity affords a great field for such treatment. In the first place, such exercises will do much toward improving the frequently deteriorated physical condition of the insane; secondly, they afford a method of calling out and improving the impaired mental faculties; and, thirdly, they constitute another valuable means of supplying to the insane that which all alienists now agree is most important to them—occupation.

"One of the great improvements that has taken place in modern asylum management," says Clouston,¹ "has been that rational physiological outlets are provided for the morbid muscular energy in cases of chronic mania. They are neither confined in their rooms, nor within, 'airing courts,' enclosed by high walls. They are made to wheel barrows, and dig on farms. They are encouraged to dance, and are well fed. Most of them eat enormously, and if they have not enough to eat they fall off, get worse in their mental state and in their habits. Many of them can be got to expend their energy in hard, regulated work, and are the very best workers on the farms and in the laundries of the asylums. They are not all, of course, furiously maniacal. Some of them simply have a slight morbid excess and exaltation of the brain convolutions, shown by restlessness, want of affection, and want of self-control, but are not incoherent. If they are kept at work, the most objectionable and repulsive parts of the older asylum life are avoided in a great measure, and the refractory wards, with their noise and danger, are not needed. The scenes with patients, attendants holding them down, and removing them into the seclusion of their own rooms, are few. No doubt there are risks run in the present system to patients and guardians, but I believe the risks are much less in reality than under the old system, for the patients are not so irritable, not so revengeful, and not so dangerous, generally."

By means of systematized exercises the insane can be provided with an additional "rational physiological outlet" for their morbid muscular energy, on the one hand, and, on the other, with a rational physiological method of calling them out of their muscular and general torpor.

A few weeks since, in the Insane Department of the Philadelphia Hospital, I started a class in systematized active exercises, selecting eight women suffering from melancholia, and putting in with them to give zest to the treatment two other cases not mentally depressed. Sufficient time has not yet elapsed to determine how much in a curative way can be accomplished by such treatment, but already the experiment has proved to me an instructive one. I found that even these patients, plunged into the profoundest depression, could, by sufficient persistence, be aroused to the performance of some movements; others did moderately well; some very well. The difficulty of fixing the attention of these patients, and yet the possibility of doing it by sufficient effort has been clearly shown. The class has made much improvement in facility and rapidity. Small classes should be formed in large insane asylums, and the treatment given a thorough trial.

An instructive case of mental disease, greatly benefited by systematized active exercises, is that of a young man who at the age of twenty-one broke down mentally, as the result of too great output

¹ Clinical Lectures on Mental Diseases, p. 158.

of mental energy, and physical exertion in business. He became depressed, and soon developed delusions of suspicion, believing that people were watching and following him. In a few weeks, under rest, the depression disappeared; he again attempted business, but became excited, and then developed ambitious delusions. He was admitted to an asylum for the insane, and in three months came out, apparently well. In brief, his subsequent history for eight years was that every year, late in the spring or early in the summer, he had a period of excitement, followed by one of depression, each lasting about three months. About three years ago, he began the use of systematized active exercises, after the method of Blaikie and others. He has since persevered with them, at the same time paying attention to diet, sleep, and general hygiene. On a few occasions he has had touches of elation, lasting only a day or two, but he has been able, owing to his increased physical and mental strength, to resist with success the beginnings of such attacks, and he has been entirely without the regular periods of depression and elevation for nearly three years.

An experiment made at the New York State Reformatory, at Elmira, has been frequently referred to of late by the medical and general press. An experimental class in physical culture was formed of twelve men, who for a period ranging from one to two years, had made no appreciable progress in their school work, and who seemed incapable of prolonged mental effort, yet could not, strictly speaking, be considered mentally unsound, or representatives of a class known as feeble-minded; with the object of ascertaining, if possible, if physical culture, as comprised in frequent baths, and massage, and daily calisthenics under the care of a competent instructor, would not result at least in the partial awakening and stimulation of dormant mental power. Increased mental activity rather than muscular development was to be the gauge of success or failure of the experiment.

Dr. H. D. Wey,¹ physician to the Reformatory, in reporting upon the results of the experiment, says that to those who were thrown in daily contact with the men, a mental awakening was apparent. They became interested in their studies, and strove to appear to the best advantage in the schoolroom. Their advancement in their studies was not steadily onward, but rather intermittently progressive. It will be interesting to note in the future, as Dr. Wey remarks, whether the good results are permanent; but whether they are or not,

¹ Annual Report of the New York State Penitentiary, at Elmira, for the year ending September 30, 1886.

the step is one in the right direction, and is to be commended to penologists everywhere.

Systematized active exercises serve a good purpose in some of the various disorders designated as asthma. One case of this kind, a young lady, despondent, weak, dyspeptic, hysterical, with feeble heart, and subject to attacks of asthmatic breathing, improved with great strides in a few weeks under general active exercises. She began treatment with half-pound dumb-bells, and at first could stand only five minutes' work. The exercises were increased, until half an hour was reached, and dumb-bells weighing four pounds were used.

In the treatment of chorea, or rather choreas, systematized active exercises are valuable. Special forms of gymnastics have been employed for this affection to some extent, particularly in France and Germany. Napoleon Laisné,¹ a French professor of gymnastics, and evidently an earnest and enthusiastic worker in his chosen field, under the directions of Dr. Blache and other physicians of Paris, has used gymnastics largely both for chorea and other convulsive disorders. In 1865 he published a book in which his methods are set forth. Both Schreiber and Dujardin-Beaumetz refer to his labors and successes. His method in mild cases, as described by Schreiber, is to place the child before him, steadying it between his knees, and then take its hands in his, and perform rhythmic movements with each arm, keeping time by counting, or, better still, singing, out loudly—"one," "two," "three," etc. The child, at the same time, is also urged to try and keep time with the movements, and not to make them irregularly.

"Care must be taken in the beginning to prevent, as much as possible, the coincidence of involuntary movements with the rhythmic ones. When the arms have been exercised, similar movements are undertaken with the legs. From time to time, a pause for rest is made, during which the limb must be held firmly enough to prevent the occurrence of involuntary motions. The child is then laid on its back upon an inclined ladder, the feet being held by an assistant; then grasping a rung above its head, it holds on in that position as long as it is able. This is to be repeated several times, and to be followed by a short rest. Afterward, the shoulders, back, and legs are rubbed and gently kneaded."

Lengthy details of treatment will be found in Schreiber's Manual.

Two cases of minor chorea improved under medicinal treatment up to a certain point, and then would advance no further. General exer-

¹ *Applications de la Gymnastique à la guérison de quelques Maladies.* Paris, 1865.

cises with light dumb-bells were ordered, and in both cases the progress to complete recovery was rapid.

In the treatment of habit chorea, these exercises have a peculiar value. This, whether in children or adults, is an annoying and distressing disorder, and commonly intractable. By habit chorea is meant an abnormal movement or series of movements, voluntary or partially involuntary, and repeated at frequent intervals. Mitchell¹ records two interesting cases, and recommends for treatment careful and good diet, light gymnastics, no school, gentle aperients, and full doses of arsenic, particularly the hypodermic injection of arsenic in the form of Fowler's solution. I refer to this treatment, as he includes light gymnastics among the measures recommended.

Among my nervous patients I have had a goodly number of cases of habit chorea. Nearly thirteen years ago I reported the case of a girl, fifteen years old, who had peculiar movements of her right ear, after a time associated with twitchings of her nostrils and upper lip, and the limbs of the right side. Another patient, under excitement, made a movement of extension and semi-rotation with one arm, sometimes accompanying it with twitching of the facial muscles. Facial grimaces constitute, as is well known, one of the most common forms of habit chorea. I have now under my charge a case of habit chorea which is being treated successfully by systematized active exercises. The patient, a girl eighteen years old, began to be troubled with spasmodic movements nine years ago. These lasted at first from one to two years, then disappeared for a year to return again, and have since gone and come several times. For the last two years, however, she has been troubled almost continuously with the movements, and has tried various modes of treatment, chiefly medicinal, but without any decided benefit. The chorea consists of a sudden jerking of the head downward and to one side, which may be performed once or several times in succession. Either with or without this twitch or jerk, she frequently also has a snapping movement of both eyes. The chorea was not started by imitation, but it is much influenced by any cause of nervous excitement, as fright.

Systematized gymnastics, either general or local, constitute a rational treatment for cases of this kind, because by means of such exercises not only is the general nutrition of the patient improved, but the nerve centres are given tone and strength, and good habits of

¹ Lecture on Diseases of the Nervous System, Especially in Women, by S. Weir Mitchell, M.D. Philadelphia Medical Times, March 28, 1875.

movement are made to substitute bad. Such eccentric and abnormal movements are the result of eccentric functioning by nerve centres, or of irregularities in the conveyance of impulses through nerve channels. By again and again causing normal impulses to be conveyed in a normal manner to muscles, in time the choreic habit will be overcome. Such treatment, however, needs to be persisted in for months.

The advantage of any treatment which involves specific direction and the adroit calling out of the volition of a patient must be evident to everyone who has had experience with hysteria in its manifold forms. In hysterical paralysis much can be done by laying out a careful plan of treatment by exercises, and gradually leading up to their full performance. In referring later to ataxias and palsies, functional and organic, methods to this end will be considered. For the improvement of nutrition, and of what may be termed the general nervous and mental tone of hysterical patients, systematized active exercises fill an important place. Properly used and controlled, they may also prove most beneficial for cases of general nervousness, and also for neurasthenia. Whatever view may be taken of the much mooted question of neurasthenia, without doubt both respiratory and muscular power, either primary or secondary, are often deficient, and the nerve centres themselves can be strengthened and improved by exercising these two powers. Care should be taken not to force individuals suffering in this way to excessive effort at first.

Great are the advantages which result from the sojourn by sea or mountain, from the cure of camp and ship; but the improvement of health obtained by such holiday treatment is often soon lost in whole or in part by the individual going back too completely to old habits of living and working. A resort to systematized active exercises for a few minutes daily will do much toward keeping the good that has been obtained.

"A man," says Maclaren, "cannot, in a week or two, eat sufficient food to supply the demands of the appetite for a whole year, neither can he take sufficient exercise to keep his body in health throughout the four seasons in a summer's ramble. These mountain excursions or sea-side sojourns must be *in addition to*, and involving no curtailment of, the daily walk to and from business, the daily ride to and from somewhere, or the daily employment with or at something; a something which will in its doing, quicken the pulse and augment the breathing, and, if possible, bring the perspiration to the forehead."

For those forms of nervous palpitation which are dependent upon a neurasthenic condition associated or not with digestive disorder,

systematized active exercises are of great value. The exercise should at first be light, but should be carefully and somewhat rapidly increased. Besides the indoor exercises, after the method of Blaikie, or with the pulley-weight apparatus, the patient should use deep breathing while walking out of doors. A case reported by Dr. Theodore Clemens¹, of Frankfort-on-the-Main, is interesting in this connection. The patient was a man forty-six years old, who applied for treatment on account of distress and irregularity of the heart. Clemens decided to make him do the thing he most dreaded, viz., climb up several flights of stairs. The effect was most happy. The patient's pulse, which had intermitted at every tenth or twelfth beat, wavered only twice, and but slightly, in a hundred beats after he had mounted three flights of stairs twice. He now decided to make similar efforts regularly every day, and in three months he was a well man.

For the group of diseases which fall to the lot of both the neurologist and orthopædist—cases of curvature, deformity, atrophy, etc.—systematized active exercises have long been used by the best authorities. I can only refer in this general way to this branch of the subject in the present paper. My more particular object is to call attention to the value of systematized respiratory exercises in setting up or straightening the feeble and stooped, who also frequently are sufferers, in some degree from nervous or mental weakness. If, at the same time, appropriate general hygiene is used, the improvement in such cases is sometimes simply wonderful. I have notes of a number of cases treated by Mr. Dodge and myself to bear witness to the truth of this statement, but time will not permit me to refer to these in detail. A gentleman, whose son had been using systematized active exercises, wrote to Mr. Dodge as follows :

“I have pleasure in assuring you that I think my son has wonderfully improved in health and appearance during the past month, while under your care. Even in two weeks we saw a marked change in him for the better—his stooping shoulders (made so by outgrowth of strength) straightening marvellously.”

For gout and lithæmia, to promote excretion and nutrition; for anæmia and spanæmia, to assist assimilation and further oxidation; for headache, sleeplessness, and nervous irritability, to soothe and calm the nervous system; to aid elimination in cases of lead, arsenic, mercurial, and other metallic or toxic diseases; for diabetes, to favor the skin and increase combustion, systematized active exercises have a

¹ Medical and Surgical Reporter, October 23, 1887.

value which cannot be too highly extolled, and one which I have had an opportunity to demonstrate in my own practice.

In curable ataxias, as in those which follow diphtheritic or exanthematous diseases, and in the hysterical varieties, systematized active movements, the patient at first lying down or sitting, and subsequently standing, have proved of great service in my hands.

In Dr. Mitchell's lectures,¹ some valuable advice and interesting details are given with reference to the best method of slowly training by what are really systematized active movements, although not so called by him. The weak and inapt muscles are cautiously brought into use. The patient is first convinced, after she has made an effort which seems extreme, that another forth-putting of will must add to the previous results. The nurse begins to train the patient while in bed, to move the legs one at a time very slowly, but in larger and larger movements, with intervals between of a minute or more.

"An order is given to lift the leg; if it be too weak, a finger beneath the ankle aids it, but no attempt must be let to fail utterly; as she gets on, the orders are to be obeyed more quickly. It is easy to sketch out for one's self what such a system should be in its details. After it has gone far enough the patient is seated in bed with some support to her spine, and is trained to move the head freely. The next step used with me to be a lesson in walking, but of late I find it better to teach the girl to creep, which is an easy and natural mode of training for the walk. The patient has pads tied over her knees, and, lying flat on her face on the floor, without skirts, has around her a folded sheet. At an order, she tries to rise, helped by a lift of the sheet belt by the nurse. When she is able to do this, and gather her legs and arms so as to make herself a quadruped, she is taught to balance herself, every effort being assisted, when needing help, by the nurse standing above her. The progress to creeping is easy; then comes the lesson of kneeling and pushing a chair; and last, that of standing in a corner or by a chair.

In the treatment of ataxic affections, even sometimes when dependent upon organic disease of the cerebro-spinal axis, the use of what may be called balancing or acrobatic gymnastics is of some value. Dr. Mortimer Granville, in the *Practitioner* for 1881, and subsequently in his monograph on "Nerve Vibration and Excitation," discusses a method for the regeneration of the nerve elements by exercise on the basis of the law of development through function, holding that the ataxic subject is reduced by dissolution to the position of a child just learning to stand or walk. His plan is to direct the patient to stand with his eyes closed in his bath, after pouring a small can of water down his spine, or applying a mustard poultice over the full length of

¹ Op. cit.

the spine for ten minutes or a quarter of an hour, to persevere in an attempt to stand for, at first, a quarter of an hour, and, as his state improves, for half an hour every morning. He is to be furnished with a chair or rail at hand, to which he can cling in case of need, but is instructed to avoid using it except when in danger of falling. The exercise must be continued diligently for weeks before success can be obtained.

In patients suffering from multiple neuritis, or some curable forms of myelitis, advantage should be taken of the first signs of motor improvement to begin with active exercises, while the use of electricity and massage is continued. The particular point upon which I desire to insist, is that the attempt to join the will of the patient to the long unused muscles, shall not be deferred a moment longer than is necessary. Simple attention to this truth, which ought to be self-evident, would, I think, in many cases have saved patients from weeks or months of uselessness.

In the treatment of various forms of paralysis that systematized active movements may be employed with advantage has long been known. Even in paralysis from organic brain disease, a clear method of using gymnastic treatment will be found to serve an excellent purpose. Such paralysis is usually the result of hemorrhage, embolism, thrombosis, tumor, abscess, or depressed fracture; less frequently of meningitis or cerebritis, of atrophy or arrested development, and still more rarely of uræmia. Sometimes in cases of sudden lesion, as hemorrhage or embolism, the assault upon the nervous system is so violent, or the destruction is so great, that death results quickly, or the patient is reduced to a state of utter helplessness, for which, practically, nothing can be done. In many cases, however, soon after the attack, or even at a later period, the amount of palsy is disproportionate to the cerebral lesion by which it has been initiated. Many cases of monoplegia and hemiplegia illustrate this truth. Little by little some of these patients regain muscular power to such an extent as almost to induce the belief that they will get entirely well; indeed, in some cases of hemorrhage, tumor, traumatism, syphilitic meningitis, and uræmia, complete or almost complete recovery does occur. We should, therefore, not disregard entirely the treatment of such patients.

The course of treatment usually pursued in these cases, in the main wise, is, at first, to do little more than protect the patient from disturbing influences; and after the shock of the attack, and the acute

inflammation which sometimes accompanies or follows it, have subsided—that is, in a few weeks or months—to give absorbents and alteratives, and to apply electricity, and possibly massage, allowing the patient to use the affected limb as he sees fit. More than this, however, should be done; and it is just here that single active exercises, after some thorough system, may play a useful part. Every effort consistent with safety, should be made to unite again the paralyzed limb with the volitional centres. Such patients often need to be incited to effort.

Two methods of systematized active exercises may be tried for these hemiplegias and monoplegias. One is the method partly of duplicated active, and partly of single active movements, used and described by some of the writers on Swedish movements; as, for instance, by the Taylors. The patient is placed in a recumbent or half-reclining posture, so that he may be able to direct all the cerebral energy at his command toward the paralyzed member, and is then urged to make some simple movement. If he succeeds to ever so slight a degree, he should simply be encouraged to repeat the movement, but he should be carefully guarded against undue or too long prolonged effort. Other simple movements are added from time to time. If he can do absolutely nothing, the operator should perform on the patient the desired movement, while the latter fixes his attention upon the performance and tries to assist. When a little headway has been made systematized active movements should be used in conjunction with electricity, massage, and duplicated active movements in an orderly and thoroughly regulated manner. With light dumb-bells and with the pulley-weight apparatus, all possible movements, and particularly those which are most wanting, should be cautiously encouraged. From a cautious pursuance of such methods I have seen a surprising result in a number of cases supposed to have reached the limit of improvement.

Such treatment does good, not only because the original lesion may have been partially removed, but also because by such efforts portions of the brain adjoining the centres destroyed may be made to take on new function; or possibly, in some instances, the other hemisphere of the brain may be called into new activity. To central spinal palsies, as well as to paralysis from brain disease, in a large measure the same truths apply.

Another method of gymnastic treatment which I have often employed with benefit in cases of monoplegia and hemiplegia, is to cause the patient, first, to make a movement upon the unaffected side, and

then instantly to perform the same movement with the paralyzed member, following this quickly with an attempt to do the same thing with both limbs. It is surprising the curious results that will be sometimes obtained in this way, if the leg is but little affected, and the patient can stand while these movements are performed by the upper extremities. To exercise the legs, the patient, of course, should be placed in an easy position, and one that will allow the movements to be performed with the greatest convenience. Exercises of this kind probably have some effect in bringing the paralyzed side of the body under control of the uninjured side of the brain through commissural channels in the spinal cord.

For some of the arthritic neuroses, and for rheumatic neuritis, or muscular rheumatism, these exercises are of undoubted value. I have seen three cases of a form of rheumatic neuritis affecting the deltoid and adjoining muscles, in which the progress to complete recovery was much assisted by an early resort to dumb-bell exercises and pulley-weights. Cases of this kind are best treated by using large doses of oil of gaultheria, or sodium salicylate, with hypodermic injections of morphia in the most acute stage; a little later resorting to massage, electricity, or both; and then to exercises with light dumb-bells or pulley-weights. Here, again, the point I wish to impress is, that such active exercises should not be deferred too long.

Hysterical aphonia or aphythia (loss of the power of whispering) can sometimes be treated successfully by a species of respiratory gymnastics, or a combination of respiratory with vocal and muscular gymnastics. Dr. Mitchell has described a method of bringing back the voice, which is really a form of respiratory gymnastics, a method which I have used several times with success, and less frequently with failure. Speaking of a young woman who had good power over the laryngeal muscles, but could neither speak nor whisper, he concluded that if he could teach her to speak only with a very full chest, he might secure an involuntary success. Asking her to fill her lungs several times, and when very full to keep her mouth wide open, he then had her try to sound the broad *a*, at the same time breathing out violently. She made a clear, audible sound, and was at once on the high road to cure. Some years ago, with this simple method, I obtained a brilliant success with a young lady who had not spoken even in a whisper for many months. I now combine light dumb-bell and pulley-weight chest exercises with this method.

In certain cases the treatment by rest, seclusion, etc., can be successfully combined with that by systematized exercises. After the

nervous or broken-down patients suitable for the treatment have progressed to a certain point; after their nutrition has been placed upon a firm basis, respiratory exercises without apparatus, or with very light dumb-bells, can be carefully begun. Five minutes, or perhaps only three minutes, should be taken at first, and the time should be increased with the utmost caution. In a recent neurasthenic case with hysterio-epileptic seizures, after the patient had improved under the rest treatment, systematized active exercises were resorted to with the greatest benefit. In those cases of hysterio-epilepsy in which the seizures are partially voluntary, or of the induced voluntary kind, the use of such exercises assists the patient in obtaining the control of herself and her movements which enables her to resist the beginning of the attacks.

Dr. C. F. Taylor, in the book to which I have already referred, has hit the secret of the combination of rest and exercise in certain cases.

"The true remedy," he says, "is rest and exercise. Let the rest be complete relaxation of all muscular effort—not the entertaining of company, sitting bolt upright, so that the spinal muscles must be constantly acting, or reclining in a 'graceful' attitude on a lounge, with book in hand, but a completely sustained position, when all the muscles must cease to act. Then the exercises to follow should be short, varied, and taken with some vigor."

The now generally accepted views with reference to cerebral localization throw some light upon the manner in which systematized active exercises, or other forms of gymnastic treatment, improve or repair the nervous system, and especially the brain. This fact has not been overlooked by authorities in neurology and gymnastics, as by Emil Du Bois-Reymond, Schreiber, Crichton-Brown, and others. In the brain are represented both a differentiation and an integration or solidarity of function. Centres for speech, for vocalization, for particular movements, for the special senses, for the muscular sense, for organic sensations, for some of the higher faculties, as of attention and inhibition, are now, with reason, claimed to have been isolated. For the localization of some of these, as of speech, motor, and some of the sensory centres, the facts and arguments are practically incontrovertible. In the plainest of terms, if brain centres which determine certain movements exist, the performance of these movements must develop and train not only the muscles concerned in these actions, but the cerebral centres with which they are connected.

DISCUSSION.

DR. HOWARD A. KELLY said: Some six years ago, while living in Colorado, a friend and myself followed the directions contained in Blakie's book very carefully. My friend was consumptive, and has since died. In spite of the condition of his chest he was able in one month to add a full inch to his chest-capacity. I was practising at the same time, and succeeded in adding three-fourths of an inch to my own. This gain was distinctly in chest-capacity, and due to increased development of the muscles.

I think that Blakie's great merit lies in the extreme simplicity of the exercises directed, many of which consist in simple rhythmical movements of the body. Among his most elaborate apparatus for room exercise is a single bar placed between the jambs of the door. We should, I think, bear in mind that gymnastic exercises are but the substitute in city life for what people get naturally in the country.

A most important point is one to which Dr. Mills has referred, that these exercises should be carried out in a medium of fresh air, and not in the super-heated air of a furnace-heated house.

A word with reference to respiratory gymnastics. When in Rostock with Professor Schatz I had some interesting discussions with him upon the subject of intra-abdominal pressure, and he suggested a series of questions. One was, "in which case is the *intra-abdominal* pressure the greatest, when lifting a bucket of water with one hand, or when lifting two buckets with both hands?" I said that it was greatest when lifting one bucket with one hand, for then we make a column of the *abdominal* muscles on the opposite side, and necessarily increase both abdominal and intra-thoracic pressure; while in the second case, the strain comes upon the muscles of the back, and pressure is not increased. The keynote to the application of this subject to nervous diseases must be this, that deficient innervation is due to deficiency and irregularity in the circulation, and improvement of the circulation is what is accomplished by gymnastic exercises.

The PRESIDENT said: I have long been interested in movement cures, and can recall an interesting case which was under my care in 1860, while a resident at Blockley Hospital. A poor wood Sawyer had lost the use of his lower extremities as the result of exposure to cold. Not many months previously Dr. Fayette Taylor, of New York, had explained his methods of resistance movements to me, and I determined to try them on the right leg of this man, so once or twice a day I caused the man to try to move his leg against resistance, and moved it myself against his attempts at resistance. Some weeks later when I was showing one of the attending physicians the improvement which had been produced in the right leg, the patient suddenly said, "Doctor that is your leg, now look at mine," and throwing off the cover, he kicked his left leg vigorously. Finding the benefit to the right leg so great, he had quietly practised on the left leg, on his own account, and had done much better with it.

DR. BENJAMIN LEE said: It is now about ten years since the lecturer of to-night published a lecture in which the views expressed this evening, and

to which we have all listened with so much profit, were somewhat tentatively held. It is gratifying that after this lapse of time he can come forward and substantiate what he then held in a partially theoretical way.

The treatment of nervous affections by gymnastic exercises naturally divides itself into two branches: the treatment of functional, and that of organic disease. In regard to functional troubles, I have always felt that the nerves on the whole are the best behaved parts of our economy; that all they want is good feeding. When a nerve misbehaves it is because it wants nourishment. Not that the patient may not be putting enough food into his stomach. He may be gorging himself, and yet the nerves may not receive a supply of nourishment which is of the proper quality, and adequate to the demands made upon them. I believe that in the muscular system we possess the great lever to act upon nutrition, and if we make use of the muscular system intelligently, we can in the majority of instances supply to the nerves their needed nourishment, and in that way overcome the functional nervous disease.

My own experience with the use of active exercises alone in the treatment of such cases has been limited. I have always combined with it massage and duplicated movements—that is to say, those in which the operator either makes a movement which the patient resists, or resists a movement which the patient attempts to make. The form of exercise in which the operator makes a movement which the patient resists gives us one of the most powerful means of acting upon nutrition. It is what we term a duplicated excentric movement, or, if the term may be allowed, an excentric contraction. By a concentric contraction of the muscle we understand that which every muscle makes in an ordinary movement, in which the muscle cell contracting in the direction of the axis of the muscle, the latter is in consequence shortened. By excentric contraction we understand an effort at contraction on the part of the muscle in which the operator uses a greater force than the patient, and the muscle is really elongated instead of being shortened. In this way, the nervous energy of the patient is directed most energetically to the muscle, and yet at the same time, as it is elongated, we are inviting into it an increased supply of blood.

The lecturer has referred to the danger of these exercises being carried to excess. This is particularly true where the exercises are carried on in classes. It is essential in carrying out this treatment in nervous cases that each case should be treated singly on its merits.

When we come to the treatment of organic nervous affections, my experience has been that, in the early stage of the disease at least, very little should be done in the way of active exercise. We should rely upon massage and passive exercise. Later, active exercise should be given in the way of carefully regulated duplicated movements. Another important point is with reference to the early use of exercise in all forms of paralysis, and especially in infantile paralysis. I believe that there are hundreds of crippled children and crippled adults going about, who if their cases had been undertaken in the way described by the lecturer, as soon as the slightest trace of muscular power was observed, would now be able to walk and have the use of their limbs.

DR. S. S. COHEN said: Dr. Mills has referred to the use of exercise in the treatment of criminals. I presume that he means more especially the criminal insane. It may, therefore, not be irrelevant to quote the views of Dr. B. W.

Richardson in reference to the prophylaxis of criminal insanity, or if these be too strong words, the rectification of the inherited moral obliquity which, conjoined with ignorance and misery, leads to law-breaking, by teaching those predisposed to a life of crime to use their muscular and nervous energies in useful pursuits. He would make the prospective forger an engraver, the prospective burglar a blacksmith or a locksmith, and so on. The arguments advanced by Dr. Richardson can be found in a recent number of the *Asclepiad*, and are worth reading. He calls attention to the high importance of this subject by illustrations from the reformatory schools. He states that children who were unruly and could not be kept in order, have been rendered docile and obedient by having their nervous energies liberated in regular gymnastic exercises at such periods as experience as shown that disorder is most likely to occur.

THE HYGIENE OF PHTHISIS.

By LAWRENCE F. FLICK, M.D.

[Read January 11, 1888.]

FROM the earliest days of the medical profession the sad fact has been recognized that when consumption has once been fully established and lung tissue has been destroyed, recovery seldom takes place. "Many,¹ and, in fact, the most of them died," said Hippocrates, when writing about the disease, and what physician, who has practised medicine since, has not in truth been compelled to say the same thing? For twenty-four hundred years, and probably during all preceding ages, some of the best minds the world has ever produced have studied and coped with this disease, and, in spite of the accumulated knowledge of all those years, about one-fifteenth² of the human family falls a victim to it yearly. There is not a clime in which it does not exist, nor a period of life at which it does not occur. The rich and the poor, the civilized and the uncivilized, become its prey. Since it cannot be cured, it is but reasonable to try to prevent it, and much has been done in this direction during the last century.

What percentage of deaths was due to consumption in the days of Hippocrates cannot be known, but that it was large would appear from his words in speaking of a certain period, namely, that "consumption" was the most considerable of the diseases which then prevailed, and the only one which proved fatal to many persons." Writers upon the subject subsequent to Hippocrates are equally barren in statistics until about the seventeenth century. The first figures that I have met with are in a foot-note in Dr. Bateman's *Diseases of London*, in which a Dr. Heberden is quoted as saying "that in 1669 the deaths

¹ Epidemics, Book I., page 353. Francis Adams's translation.

² In 1880 the percentage of deaths from phthisis in the United States was 12,059 in every 100,000, and in England 9141 in every 100,000. Taking these two countries as a basis, we may assume that, the world over, about 7 per cent. of the deaths are due to phthisis.

³ Francis Adams's translation, page 353.

⁴ Historical Survey of the Diseases of London, page 22. Thomas Bateman.

from consumption were to the whole as one to about six and two-tenths ; in 1749 one to about five and five-tenths ; in 1799 one to about three and eight-tenths ; in 1808 one to about three and six-tenths ; and in 1818 one to about four and two-tenths." In the beginning of the present century Dr. Willan, in his statistics on the diseases of London, gives the percentage in his private practice as about one in three ; and says that the proportion in the general mortality reports for the winter months at that time varied from one-third to one-half. In 1880 the percentage of deaths from phthisis in England was 9141 in every 100,000, which indicates a marked improvement. This improvement is not due to a larger number of cures, but to a more successful prevention which follows in the wake of civilization.

It is scarcely disputed by any one at the present day that consumption is due to the bacillus tuberculosis. Concomitant with this doctrine is necessarily that of its contagiousness, and whoever accepts the one must accept the other. And why should it not be accepted ? It is the reasonable doctrine, and the one consistent with all modern teachings about disease. It is, moreover, the only doctrine which can explain all the phenomena of the disease without appealing to one's credulity, and upon the assumption of which we can ever hope to construct a barrier to the progress of the disease.

Heredity ought to be out of the question at the present day. It is an unreasonable theory, and at variance with all modern knowledge about the etiology of disease. Its complete eradication from the public mind is one of the first steps necessary in a sanitary crusade against phthisis. So long has it held sway, and so thoroughly has it been woven into our literature, into our ways of thinking, and even of acting, that it has actually become a remote cause of the disease. Men and women are daily dying victims of consumption because they have not the courage to escape its clutches. Their grandparents or parents, their uncles or aunts, or somebody in their families has died of the disease, and it is a foregone conclusion that some day, sooner or later, they too will die of it. They are tabooed by society as fore-ordained victims, they are refused life insurance on the slightest pretext, and are at a discount in the marriage market unless heavily endowed by purse or landed estate. Their lives are one continuous worry lest the disease overtake them, and yet they do nothing to avoid it, or the depressing influences which lead to it. If they do finally succumb to the disease, their education and that of the public have been factors in its production.

Somewhat akin and often confounded with heredity is the doctrine

of predisposition. That some families are more apt to develop certain diseases than others is beyond dispute. What this predisposition consists in, and whether dependent upon the blood, the nerves, or tissues, is as yet one of the hidden secrets of nature. It is certain, however, that it can be transmitted for generations, and that, like complexion and features, it may go to only certain members of a family, may skip a generation or two and reappear, or may disappear entirely. It sometimes goes with one or the other sex, and sometimes accompanies certain complexions and features. Whilst it often exhausts itself by the laws of survival, it may also be generated *de novo* by the modes of life and habits of the parents. The tight-lacing girl, the pale-faced, dissipated young man, the overworked store girl and factory hand, the tea-drinking, bibbling servant girl, the drunken father, the half-starved, badly clothed mother—these are some of the progenitors of predispositions to phthisis.

So much in brief about the theories on the etiology of consumption. Their consideration has been necessary in order to study intelligibly the means for its prevention.

Both in theory and practice we find that consumption, though contagious, is but mildly so. This is, in my estimation, not so much due to the inefficiency of the bacillus tuberculosis as to the withstanding power of the lungs of most people. The bacillus tuberculosis never finds a nidus in a healthy lung—by healthy, I mean not only freedom from pathological change, but a strictly physiological condition in which every function is properly performed. Like the brain, I believe the lungs may be functionally abnormal, and yet there be no pathological change discoverable. There is a very close relationship between this functional abnormality of the lungs and the digestive apparatus, and, in a sequential way, the whole nutritive system. It is upon the stomach, then, almost as much as upon the lungs, that much depends in the prevention of phthisis. The stomach is usually the first traitor in the human economy. Through its derangement many diseases gain entrance into the body. When the stomach fails to perform its work, the lungs will soon do the same. A vicious circle is established, and they mutually derange each other. Malnutrition follows, and the lungs become a proper soil for the bacillus tuberculosis. Every care should therefore be taken to keep the stomach healthy, and to do this a sufficient and proper supply of food is necessary. Too much food is as injurious as too little, and improper food worse than either. When the stomach is filled with indigestible food,

nutrition is not only withheld, but the stomach is unfitted for the proper performance of its work for some time thereafter.

It is generally in overfed and improperly fed people that we have what is called galloping consumption. Though apparently well nourished, their entire appearance is suggestive of too much foreign matter in the blood. It is from this class of people that the mortality list from consumption is kept so high in America, and it is chiefly the foreign element in our population which constitutes the class. The deaths from consumption in the United States are nearly twice as numerous among the foreign population and their children as among the children of the native born. In Rhode Island, according to the health reports of that State for 1880, one person in every 486 of native parentage dies of consumption, while one in every 286 of foreign parentage dies of the disease. According to the United States census reports for 1880, out of every 1,000,000 deaths, 242,842 males and 302,046 females die of consumption. This represents all nationalities and colors. Among the colored race every million deaths represent 248,179 males and 326,973 females as having died of consumption. Among people of Irish parentage 309,507 males and 375,636 females die of consumption to every million deaths; and among people of German parentage the victims of the disease number 249,498 males and 254,958 females to every million deaths. It will be seen that the largest percentage of deaths from the disease is among Irish immigrants and their children. This is usually ascribed to the change in climate. Ireland has a much damper climate than America, and therefore one better suited to the development of phthisis. The real cause for the larger mortality from consumption among foreigners, and especially among the Irish, is the change in diet. At home they have been accustomed to a plain, healthy diet, and when they come to this country they at once take to the varied heavy diet of Americans. Where they have eaten little meat at home, they eat it in profusion here. Where they have drank good milk and eaten vegetables at home, they drink teas and coffees and eat spiced foods here. They soon become thorough Americans in their stomachs, and even outdo the natives. The consequences are indigestion, malnutrition, tuberculosis. The German, though frequently pursuing a similar course, is often spared by his characteristic thrift and economy. He partakes more sparingly of the good things that come in his way, because of his anxiety to prepare for a rainy day. His fondness for beer, a beverage which he manages to secure wherever he goes, may likewise have some influence in shielding him against phthisis.

Sufficient fresh air, sufficient food, and sufficient rest and sleep are the watch-dogs of health, and where they are on the alert consumption can never enter. Bacilli tuberculosis may permeate the air, but they can do no harm. Could civilization reach such a stage of perfection as to make it possible for every human being to have all these, it would be in the power of everyone to avoid phthisis. Such a condition of things is, however, impracticable. It therefore becomes necessary not only to deprive the bacillus tuberculosis of its proper soil, but also to destroy the bacillus. This function belongs as well to the State as to the individual. Modern governments are beginning to appreciate the importance of preserving the health of their people, and are everywhere establishing health boards. As yet, however, they do not go far enough. Medical science has grown beyond the mere art of prescribing remedies; it has become a science of protecting man against disease and enabling him to attain his three score and ten. As government exists for the good of society, it ought to avail itself more extensively of so powerful a means to its end. The medical profession should be represented in our government. There should be a department of medicine, as there is a department of agriculture, of justice, of finance, etc. Surely human lives are as valuable as those of dumb brutes, and we want protection as much against the invisible foes which threaten our health as the visible ones that threaten our hearths. Unfortunately, public sentiment has not yet been educated to appreciate sufficiently the importance and benefit of sanitary measures, to make such a thing practicable. Did such a department exist, and did physicians in good standing and with scientific attainments occasionally enter the field of practical politics and allow themselves to be returned to city councils and State and national legislatures, sanitary science might shed its light upon legislation and many existing hygienic evils be remedied; many social and commercial customs and practices which are daily generating predispositions to consumption by the thousands might be corrected. Plainer living would come through proper instruction upon the subject and the instillation of the necessary sentiment in our schools. Not only ought children to be taught what to eat and drink, but also how to prepare their food and what quantity they can take consistent with health. Nor should instruction upon the proper adaptation of food to the time of life be overlooked. Many children are already dyspeptic when their school days begin, and in their cases the benefit of instruction could only accrue to the second generation. The depressing influences of private vices in children and young people could often be averted by early instruction of the proper kind. Such

instruction should, of course, come through the parents, but parents are themselves frequently devoid of the proper knowledge, hence the government might supply it to them by the free distribution of appropriate books. How many social and moral evils might be warded off were the proper knowledge brought to the thousands who would gladly avail themselves of it, were it within their reach !

Legislation might in a measure protect the weak against the oppression of the strong. One needs but visit the parts of large cities where the poor live, and note the crowded, filthy courts, alleys and tenement houses ; or take a stroll through a badly ventilated factory or retail store in which the employés are compelled to work long hours in unhealthy positions and with the most wretched accommodations for the ordinary demands of nature ; or examine some of the articles of food and drink that are openly sold in shops and on the streets, to understand what could be done in the way of sanitary science by wise legislation. The remedying of such wrongs and oppressions would very much lessen the mortality from consumption by withdrawing the soil necessary for its development. But all this is mere speculation of what we may hope will take place in the future. For the present we must content ourselves with discussing the weapons against the bacillus tuberculosis, which governments can use as they are now constituted.

The usual methods employed by our boards of health for combating disease are isolation and disinfection. Against consumption, isolation, if it were even practicable, would be both useless and cruel. It is a question in my mind whether the existence of the bacillus tuberculosis is solely for the destruction of human lungs ! In view of the universality of phthisis it is not entirely a matter of fancy to suppose that the parasitic life of the bacillus in man is incidental and that it plays some useful rôle in the great chain of transition between organic and inorganic matter. It seems to be everywhere and to be wafted about by the air. Isolation could therefore not confine it, nor afford protection. The only benefit that could be derived from it, would be the withdrawal of the relatives of patients from an atmosphere saturated with the germs of the disease and their protection against contamination by the sputa. This would be a poor return for the dreadful inhumanity of separating the poor victims for years from their relatives. The same results can, moreover, be attained without isolation by disinfection. With well-equipped, thorough boards of health and properly instructed laity, satisfactory protection could be secured to those who by family ties or otherwise are compelled to live in the

same house with the afflicted. The house, and especially the room, in which the patient sleeps ought to be frequently disinfected with some suitable germicide, and particular care should be taken to disinfect the sputa. For the former purpose sulphur may be burnt or a spray of a strong solution of carbolic acid be used, and for the latter carbolic acid or corrosive sublimate solution be placed in the vessel that receives the sputa. To carry out these measures in practice, consumption would have to be placed upon the list of contagious diseases returnable to boards of health, and the present force of existing boards of health would have to be largely augmented. The beneficial results, however, would be ample compensation for the inconvenience and expense. That there would be a marked decrease in the mortality from phthisis I have not the slightest doubt. Better opportunities, too, would be afforded to study the disease, as more reliable reports would be made and fuller statistics be gathered.

Health boards should, moreover, help to disseminate proper knowledge upon the subject. If ignorance is the parent of vice, it is certainly the grandparent of disease. It is a matter of daily occurrence that people who have consumption and who are constantly expectorating infectious matter, fill positions in which they must necessarily contaminate the clothing, food, and drink of others. There are consumptive tailors and dressmakers, consumptive cooks and waiters, consumptive candy-makers, consumptive bakers, consumptives indeed in every calling of life. These people do not suspect for a moment that they are spreading the disease, and take no precaution against doing so. They are often poor people who have to work for their living and who as long as life remains in them have to earn its support. They do not even know that they have consumption, or at least they persuade themselves that they have not got it. They expectorate on the public highways, in church, at the theatre, at their places of business or work—in short, anywhere and everywhere that is convenient, and the sputa dry up and are carried into the lungs of others, or find their way into food and drink. First of all, people ought to be made thoroughly familiar with the infectiousness of the sputa, and ought to be taught how to disinfect them. This knowledge should come from the government through the boards of health. Physicians and public teachers can do much toward creating a proper sentiment, but they cannot convey the instructions in an authoritative and effective way. In the next place, no consumptive should be employed in any capacity in which he may contaminate the clothing, food, or drink of others. To obviate hardships in such cases, the

government should make provision out of the public treasury for the maintenance of such people as have to give up their means of livelihood for the public good. Whether this be done by pension or by offering an asylum must remain for political economists to decide. No hesitancy is felt in spending millions for the resentment of an insult to our national honor, or for some commercial advantage : Why should not something be expended in the protection of our people against the ravages of a disease which in the United States carries off nearly a hundred thousand people annually? Small remedies will avail nothing with so great an evil. Our government should act and act with gigantic strides.

As regards individual effort to prevent the spread of consumption, it must necessarily be confined almost entirely to those who by predisposition are likely to develop it. They should not only lead strictly hygienic lives in every particular, but should avoid everything that might even remotely lead to the disease, and avail themselves of every weapon against it. The nearer they follow Nature in her dictates as to how to live, the better. They must not revel in excess, turn night into day, overload their stomachs, overtax their brains, strain their physical endurance, and play havoc with their constitutions generally, as their more favored brothers and sisters do with impunity. They must lead correct, orderly lives, and be ever on the alert that their physical condition may not fall below par. As regards the weapons to be used against the disease, it may be well to pass some of them in review.

Climate has always been looked upon as an important factor in the production and prevention of consumption. Its importance, however, seems to me to have been much exaggerated. A non-porous soil is undoubtedly a contributing agent to the production of consumption, but not more so than of many other diseases. Consumption occurs in every country and every climate on earth, being modified in prevalence by the various modes of life. Vicissitudes of climate have really little to do with the disease. Those people who are most exposed to the weather seldom die of consumption, whilst those whose lives keep them indoors are its most frequent victims. Women, for example, die much more frequently of the disease than men. Nor does warmth or cold or altitude exert much influence. The colored people, who live largely in the warmer portions of the United States, have a higher mortality rate from consumption than the white people, the majority of whom live in the colder portions. In short, consumption prevails everywhere, no matter what the climate, where people are compelled,

by the demands of society, to crowd together and live much indoors. The practical lesson to be drawn from these facts is, that persons who are predisposed to consumption by reason of the lives of their forefathers, or the peculiar circumstances surrounding their childhood, ought to adopt a calling in life which keeps them out of doors and away from cities.

There is a popular belief that alcoholic drinks are powerful preventatives of consumption. This, like all popular beliefs and superstitions, has undoubtedly some truth for its foundation. But, as is usual with the bastard progeny of desire, this grain of truth has grown into such immense proportions as to have become the stumbling-block of many. No one who has carefully studied consumption can have a doubt that there exists some relation between its production and the non-assimilation of hydrocarbons. Very many cases of phthisis have traces of sugar in the urine, and probably all of them have indigestion of heat-producing food. These symptoms frequently exist for months before cough and discernible local congestion sets in. As beverages containing a small amount of alcohol present a most readily assimilating form of hydrocarbons, they no doubt, when properly used, buoy up the weakened system in its struggle against the bacillus tuberculosis, and often enable it to gain the mastery. But what is good in moderation is always hurtful in excess, and in this instance precipitates the very evil it might otherwise prevent. Excess of alcohol and the adulterating ingredients in alcoholic beverages derange the stomach, and thus by interfering with nutrition predispose to consumption. In this way a long life of hard drinking sometimes ends in phthisis.

A very noticeable fact in the mortality statistics of consumption is the predominance of females among its victims. This is in a measure due to the indoor life of women, but not altogether. The many accidents and diseases incidental to the physiological life of women greatly predispose to consumption. These are, however, nearly all of an avoidable character and have their fountain-head in carelessness during the menstrual period and during the puerperium. Women should be taught from childhood that these are sacred epochs, and that during them nature demands rest and especial care. The Semitic six weeks' rest after childbirth is true to nature and should be observed by every woman who becomes a mother. Lactation frequently predisposes to consumption, but usually in those cases which have made bad recoveries after confinement and are in want of the proper food and care which are necessary for a nursing woman.

Pulmonary gymnastics are powerful weapons against phthisis and

should be especially used by those who are unable to extricate themselves from the unhygienic surroundings and circumstances in which their necessities have placed them. Though the use of a gymnasium is very desirable for practising these, it is not necessary. The principle involved is ventilating the unused air-cells, and any combination of forced respiratory movements that will thoroughly inflate the lungs will accomplish this. Gradually filling the lungs with air whilst retracting the shoulders and extending the chest or taking a deep inspiration whilst extending the arms above the head and expiring whilst placing them parallel with the body, are two simple exercises which do all that is necessary and can be taken without interfering with the most busy life or causing fatigue. A habit should be made of thus ventilating the unused portions of the lungs, and it should be done at times when the purest air can be secured. The most practical germicide that we as yet know of for the bacillus tuberculosis is fresh air, or, more correctly speaking, it furnishes the least favorable habitat for its development. A better oxygenation of the blood is, moreover, secured by such exercises, the circulation is stimulated, and, indirectly, the digestion and assimilation improved.

As regards the hygiene of phthisis, when the disease is once established, it is based upon the same principles as that for its prevention. Sufficient nourishing food, and sufficient fresh air, these are the *sine qua non*. The prime object in every case of phthisis should be to secure a good digestion and assimilation. Everything that is done should be done with this object in view. Good, nourishing, and easily digested food should be taken in abundance, and every care taken that the stomach be not deranged by indiscretions in eating and drinking, or by overloading. As soon as the body begins to nourish, the lung trouble will improve. As an aid to digestion outdoor exercise is very important. Without it the system cannot be made to use up a large quantity of food. Inasmuch as warm climates offer greater inducements to keep invalids out-of-doors, and make bedroom ventilation a little more agreeable, they are highly commendable to consumptives; but they are by no means essential to their well-being. A cold climate will do just as well if the patient has the courage to endure the discomforts entailed by it. It is much better that a consumptive have home comforts in the worst climate in the world, than that he be compelled to undergo the tortures of boarding-house or fourth-class hotel life at a health resort. In all warm climates the houses are built for warm weather use, and no provision is made for the stray blizzard that occasionally comes along. Though the temperature

may be very equable from day to day, there is always a marked variation between day and night. In consequence of the rapid radiation of heat the houses become cool and damp during the night, against which there is likewise no provision, except in first-class modern hotels. In many places suitable food is difficult to obtain even at the most extravagant prices. All in all, the average person who has consumption had better remain at home, unless his home is in a large city, and then he should go into the neighboring country, where he can secure home comforts and plenty of suitable food. Let him dress warm, take outdoor exercise whenever he can, eat plenty of light, nourishing food, take ample rest and sleep, and he will get along much better in his native heath than he would with small means in the most model consumption climate.

It is important that the entire body be warmly clad in cold weather. Either silk or woollen clothing ought to be worn next to the skin. The circulation should be kept equable throughout the whole body, hence the extremities ought never to be let get cold. When the feet get cold, the lungs become congested. Rubbing the body with a coarse towel has a good effect in equalizing the circulation. The ancients recognized this fact, and laid stress on it. "*Balneum alienum est*," says Celsus. Sponge baths, if carefully taken, will do good. They should, however, be taken in a warm room, and followed by a rest.

Sea-voyages used to be highly recommended in the early days of medicine, and theoretically, at least, ought to be beneficial in the first stages of the disease. The ocean offers a pure atmosphere, and frequently the salt air stimulates appetite and improves digestion. In the advanced stages of the disease they are, however, impracticable, and should never be attempted.

Gypsy life, or travelling through the country by easy stages and camping-out, is most beneficial to consumptives, even in advanced stages. The ancients had their patients carried from place to place in chairs. In the territories most remarkable cures are brought about by this mode of living. Persons unable to walk are hauled in wagons on improvised beds, and it is astonishing what a revivifying effect constant exposure in the open air has.

But, as said in the beginning of this paper, when consumption is once established it is rarely cured, and though much can be done to ameliorate the condition of the consumptive, the most important duty of the medical profession, at the present day, is to lend its aid in

bringing about such a change in public and private hygiene as to give the disease less chance for development.

Civilization is the keystone on which the barrier to the progress of phthisis must be built; but it must be a high order of civilization, a civilization in which charity for our fellow-man is the guiding star—which teaches not only how to live, but how to let others live—which banishes want from the earth, gives every body sufficient breathing space, and removes the foot of monopoly from the neck of the working-man and the goad from his side; which will remove morbid ideas about dress, society, customs, and education, and banish all vice and excess from the world. So long as the “summa bona” of man’s existence is to live at ease, gratify every desire, and tower head and shoulders above everybody else in importance; so long as one-half of the human race must be without the necessities of life in order that the other half may revel in excess; so long as crowded tenement-houses must tower in the sky in order to let palaces spread out on the surface; so long as soulless corporations can drive man to do more than a whole day’s work for half a day’s pay, and under circumstances and surroundings which are in conflict with every rule of health; so long as the rich lead and the poor follow in health-ruining fashions and customs; so long as children have their minds made morbid and their bodies ill-developed by school-cramming processes; so long, indeed, will consumption continue to be epidemic, no matter what progress scientific medicine may make.

DISCUSSION.

DR. T. J. MAYS said: I have listened with much interest to this remarkable paper, which expresses a view which I did not think existed to any extent in this city. The author attributes the existence of pulmonary phthisis to the bacillus tuberculosis. I do not think that such a view is borne out by the facts. If it were true that phthisis is propagated by contagion, those who are the most exposed to the disease should be those who would be most liable to contract it. The facts prove that this is not the case. Probably the best evidence of this is found in the history of Brompton Hospital, of London, when the report was made a few years ago. This hospital had been in existence thirty-six years. It has a capacity of nearly four hundred beds. The history includes all those who were connected with the hospital as physicians, nurses, etc., during this period. Not one case of the disease could be traced to the hospital as the source of contagion.

Dr. Brehmer gives some remarkable results in his book on the *Etiology of*

Pulmonary Tuberculosis. He states that in the town of Görbersdorf, where his hospital is located, the mortality rate of the native inhabitants from phthisis twenty years ago, at which time the hospital was established, was fifty per cent. greater than at present, notwithstanding that during that time there have been present about twelve thousand consumptive patients who have freely mingled with the citizens. It also often happens that at health resorts for consumptives the physician himself is the subject of the disease, and yet, under such circumstances, frequently improves in spite of the presence of the tubercle bacilli.

The author advocates a strict quarantine against the bacilli. Precisely such a quarantine was carried out in Naples for sixty years, up to forty years ago, but the results were entirely negative.

In another statement the author is, I think, not borne out by facts. He states that females are more liable to the disease than are males. I have recently gone over an enormous amount of statistics, collected in this country and abroad, and they show that females are much less liable to the disease than males. The report of my statistics will be found in *The Medical News* of January 7, 1888. The fact that the disease is less frequent among females may be accounted for by the fact that they have a more extended apical motion than the male, and we know that consumption never occurs in any one who has a well-developed apical expansion.

On the whole, one cannot help but be pleased with the paper, but while I admire it, I cannot agree with all the statements which it contains.

DR. J. DALAND said: I think it has been well ascertained that an hereditary predisposition does play an important influence in the causation of phthisis. It seems to me that this fact still remains well established.

With reference to the climatic treatment of phthisis, I do not think that this can be dismissed with the few words which the author has given to it. There seems to me to be no doubt that in the early stage of the disease, particularly in young men, that a change to a colder climate is of benefit.

The disinfection of the sputa is a point on which sufficient importance is not usually placed. It is a matter of the greatest moment, and should be employed in every case of phthisis.

DR. S. SOLIS-COHEN said: I believe that it was Mr. Spencer who thanked a certain philosopher for benefiting him by expressing opposite opinions in a forcible and eloquent manner. I can make my acknowledgments to the reader of the paper in similar language. I admire the suggestiveness and the vigor of his paper, but I find it almost impossible to agree with any of the theories advanced. As to the practice advocated, physicians of experience are all of nearly one mind; nor has Dr. Flick permitted himself to be led astray in this matter by his theories.

The question of the omnipotence of the bacillus tuberculosis is one which deserves to be ventilated on every occasion. I have already to-night quoted the remarks of Dr. B. W. Richardson in another connection, but as I consider him the master-mind in medicine of the nineteenth century I need offer no apology for again quoting him. He says, "What have we done, to be visited in the heavens above, in the earth beneath, and in the waters under the earth, with the *pestis bacillorum*, which is now regnant?" Everything is bacillus.

Dr. Richardson believes that it will not be long before the bacillus of pregnancy will be discovered.

I think that Dr. Flick has himself given the strongest argument against the bacillophobic views he advances. The chain of events graphically described from several starting-points invariably concluding—malnutrition and consumption. Malnutrition is the fundamental, the bacillus is the accidental. It may be that the bacillus does, when inoculated, under certain circumstances, cause tuberculosis, there is some doubtful evidence bearing on this point which cannot be dismissed in a discussion of this kind. Even admitting that inoculating with the bacillus will cause consumption there is no evidence that the inhalation of the bacillus will cause the disease. The inhalation of sputa and the inhalation of the bacillus are two different matters. The pus-cell and the coccus pyogenes are not at all synonymous. There may be in the mixture which goes to make up the sputum an element similar to those bodies which we know as the leucomaines and ptomaines, which, in a person predisposed and in low condition, may be capable of exciting the disease by interference with nutrition or otherwise. The evidence on all these points is very far from being clear.

But granting, for argument's sake, that the microbe is one of the existing causes, we must still recognize, as the reader of the paper has pointed out, that the bacillus is everywhere present, and no matter how powerful are the means brought against it, they are incapable of destroying it or of dislodging it, when it is once in the lungs. Even if we could destroy every bacillus in the lungs, at the very next breath the enemy is once more within the stronghold. Therefore, the only rational thing to do, to prevent consumption, whether the bacillus be a cause of the disease or not, is to build up the nutrition of the individual by the measures mentioned to-night and by others. We must utterly discard the misleading, and therefore destructive, idea that by bringing germicidal agents against the bacillus tuberculosis we can benefit our patients in the least. Treat the patient and the bacillus will take care of itself.

The question of the marriage of those who inherit the tuberculous diathesis—and that there is such a diathesis universal experience goes to prove—is a very important matter, and, notwithstanding the views advanced, I think that every one of us should warn against the marriage of those whom we have reason to suppose would transmit such a woful inheritance.

The question of baths in consumption is an important one. There are two methods of failure of function in consumptive patients which we must recognize. The one is a failure of assimilation, and the other, no less important, is a failure of excretion. The skin is an important excretory organ, and it cannot be kept in the best functional condition without bathing. While we may not plunge a patient into a cold bath, we must see that he keeps the skin of the entire body cleanly, and as active as circumstances permit. Baths at a moderate temperature, when possible, or if not, daily sponging of the entire body should be insisted upon. This will often relieve pathological sweating. It is also a question of the greatest importance in how far we shall check sweating by drugs, whether, to reduce the skin to a dry and hot condition, is not far more dangerous than the very moderate perspiration for which atropia and other drugs are frequently given. This question must, of course, be

decided in every case upon its own merits, with due attention to all the circumstances. Still I feel that it is often better to depend upon our general measures for the relief of this and other special symptoms than to resort at once to symptomatic medication.

DR. M. PRICE said: I would ask Dr. Flick with reference to his experience with inflammatory conditions as a cause of phthisis. I do not believe in hereditary consumption. I believe that ninety per cent. of the cases of consumption come from some inflammatory condition as the starting-point. I am a firm and positive believer in the inflammatory origin of consumption. In nineteen years of practice I have not seen more than three or four cases in which I could not discover an inflammatory cause. I believe that without this inflammatory starting-point, consumption is impossible.

DR. FLICK said: I felt considerable hesitation in presenting this paper, as I knew that the opinions expressed were in conflict with those of many on the subject. I have strong convictions on the subject, however, as I have myself been the unfortunate victim of the disease. I have given the matter a great deal of thought, and have observed the effect of many remedies and of hygienic conditions. I do not know that those who have discussed the paper got my exact ideas on the subject. I hold that consumption is entirely dependent for its initial starting-point on malnutrition. I hold that without malnutrition and malassimilation such a thing as consumption cannot take place. I think that when one is run down he is then a fit subject for the bacillus tuberculosis, and unless he is run down and his digestive apparatus is out of order he will never fall a victim to phthisis, no matter of what his parents or his grandparents died.

The objection based upon the fact that nurses in hospitals do not contract the disease from their patients, is not well grounded. The nurses and others connected with a hospital are generally well nourished, as they get everything that is necessary to keep up their condition. When they get below par they fall victims to the disease.

I believe that no consumptive patient derives benefit from climate in itself. The benefit comes from the change of life and from the out-of-door life. If the patient lives an out-of-door life and takes nourishing food he may recover. If he goes to any climate and stays in the house he will die.

With regard to the relative frequency of the disease in males and in females I would state that my statistics are drawn from the census reports of the United States.

I have no doubt that inflammatory conditions of the lungs have some bearing on the production of the disease, inasmuch as a person who has had pneumonia is left in a depressed condition. I think, however, that a mistake in diagnosis is often made. I believe that a case is often considered to be one of pneumonia when really it is a case of phthisis. It is said that pneumonia has run into phthisis when in reality it was a case of phthisis from the beginning.

I have brought this subject forward with the hope of exciting discussion. This is a matter which is too much neglected. There is no disease that causes as many deaths as does consumption, yet we have become so accustomed to it that we do not give it the attention which it deserves.

RUBBER CUSHIONS FOR SURGICAL PURPOSES.

By HOWARD A. KELLY, M.D.

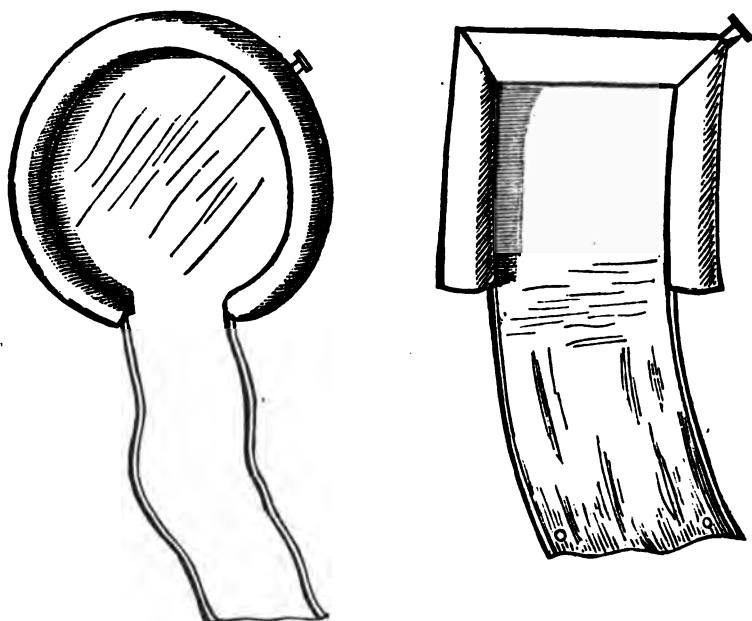
[Read January 11, 1888.]

It is now almost a year since I put in the hands of Mr. Levick, manufacturer of rubber goods, several designs of cushions for surgical purposes. These cushions resemble those commonly used by students at lectures, in having an inflatable rim, but differ in being left open on one side, being C-shaped or rectangular, with one side out. They have a bottom of rubber sheeting extended into an apron some inches in length, for the purpose of drainage. I have had constructed three separate forms, a large C-shaped cushion measuring about twenty inches in diameter, the opening of the C being about eight inches across, and the apron twenty inches in length. The rim measures about two inches in diameter when inflated. This pad I constantly use for abdominal sections, it is also of great service in obstetrical cases requiring operative manipulation. It permits the free use of water for douching purposes; drains all blood and water from the field, enabling the operator to return the patient at once to bed, without the necessity of removing clothing or changing linen. It has each month saved me more than its cost in the wash at my private hospital.

A similar pad of the same pattern, measuring but ten inches in diameter, is in use on the examining table in my office, in all cases in which it is necessary to douch out the uterus or vagina.

The third pattern, which is in constant use for minor gynecological work, is the perineal cushion. It is rectangular in shape, opening on one side, having a rubber bottom and long apron similar to the preceding. When in use the patient's clothes are elevated, and the thighs held flexed on the abdomen by my "Beinhalter." The buttocks are drawn down over the edge of the inflated rim, and the apron which hangs down from the edge of the table carries off all blood and the water used throughout the operation.

There is no one device in all my gynecological work which has given me so much comfort as these simple cushions. I use gallons of water with the utmost freedom, and without ever being obliged to think once where it is going. In perineal work, instead of using sponges, I use constant irrigation, which prevents clotting of blood, soiling of instruments, and replaces at no expense, and with greater comfort and satisfaction, the sponges formerly used. The work thus accomplished is neater and cleaner, and the results are better.



I also present now for the first time a design for a rubber bed-pan. It is oblong in shape with an inflatable rim and a rubber bottom. It differs, however, from any previous device, in the fact that one end communicates with a large, funnel-shaped reservoir, terminating in a large nozzle through which the fluids are finally discharged. The whole peculiarity of the device depends upon the funnel and its outlet, the funnel is very broad at the top, being the full width of the cushion, about seven inches in depth to the tube, terminating in the discharge pipe of the same length, which is perforated at its under side by a buttonhole for attachment, when in use, to the rim of the cushion. When the cushion is in use the rim is inflated, the discharge pipe is buttoned to the rim, and the patient is placed upon the cushion. Vaginal or rectal injections are now to be given. The fluid, as it is

discharged from vagina or rectum, accumulates on the floor of the cushion, the amount this will hold depending entirely upon the depth of the inflated rim and the size of the cushion and reservoir. When it is desired to empty it the rim is caught in the hand at the upper end, and carried with the funnel hanging downward; all fluids at once gravitate into this, but do not escape, owing to the attachment of the discharge pipe to the rim. It is then carried to the closet and the discharge pipe unbuttoned, when the fluid rushes out; it is further cleaned by allowing the water to run freely through it in the same manner.

The advantages gained by this device are very great. The softness of the rubber is a great advantage over the hard bed-pan; the capacity of the cushion is much greater, and may be made to vary with the size of the reservoir alone. It can thus be used for purposes for which the bed-pan is entirely inapplicable. The facilities for cleansing are perfect, eliminating the chief objection to which rubber cushions hitherto in use are open. The ease of transportation is also an available feature, as when collapsed it can be rolled up and packed away in small space. It can also be used for continuous irrigation, by leaving the discharge pipe, which can be made of any length, hanging over the side of the bed, discharging on a piece of rubber sheeting which conducts the fluid into a bucket.

DISCUSSION.

DR. J. PRICE said: The only matter about which any question exists, the only thing in controversy, is whether Dr. H. A. Kelly has any claim whatever as the inventor or originator of the irrigation pad. Such claim he has not only set up here but elsewhere, without, I claim, a shadow of authority in fact. Introducing the instrument here he has made it legitimate matter for discussion; not only as to the merits of the instrument, but the genuineness of its authorship. About five years ago I conceived the importance of an irrigation pad or cushion, and from a design of my own my friend, Dr. John Madison Taylor, made a drawing. The instrument, as drawn, was ordered through Kolbe. Dr. H. A. Kelly saw it not only at the instrument store, but also at my office. He there examined it and we discussed its merits. I here present a bill from the New York Rubber Company for making this operating cushion, dated January 7, 1885.

DR. KELLY said: I am sorry that anything so unpleasant should have come before the Society, and I should not have brought up the matter had not the remarks in reference to it been made so publicly after the last meeting that I have been forced to defend myself. I can only repeat that I have no recollection that Dr. Price ever spoke to me on this subject.

FLEISCHL'S POLARIZING SACCHARIMETER.

[Exhibited January 25, 1888.]

DR. JAMES TYSON exhibited Fleischl's Polarizing Saccharimeter, made by Reichert, of Vienna, and explained its use. The deviation is indicated by the displacement of a dark band continuous in two parallel spectra, when no glucose is interposed and the instrument reads 0. When a column of sugar is interposed a deflection takes place, and after the continuity is again restored the *percentage* of sugar is read off from the vernier.

Dr. Tyson said the polarizing saccharimeter could not be recommended for testing qualitatively very minute quantities of sugar, say anything less than one-half of one per cent., Fehling's solution being really more delicate. Nor can it be said that there is any saving of time in testing quantitatively solutions containing less than one per cent.

The advantage of its use is shown in determining from day to day the quantity of glucose in specimens containing considerable amounts, where the requisite dilution and titration occupy much time.

In very clear urines it is not necessary, with Fleischl's instrument, to decolorize with acetate of lead solutions, but where they are not almost colorless it is necessary to treat with basic acetate of lead in the proportion of 1 c. c. to 10 of urine and filter, when one-tenth should be added to the reading of the vernier.

DISCUSSION.

DR. L. WOLFF said: The instrument to which Dr. Tyson referred, and which I had the honor to bring before you here, is known as a polarization-microscope, though this is an improper term, as it is simply the utilization of the microscope stand for the adjustment of the parts of a polarizing saccharimeter. I imported the parts constituting this about a year ago from the manufacturer, Paul Waechter, of Berlin. Its principal advantage is that of price, which, to the best of my recollection, is about twenty-five dollars when bought here. Like all other saccharimeters it consists of a polarizer which, as you see, is attached to the substage; on the top of this fits a plate consisting of two demidisks of quartz of opposite rotary power, which let the intersecting line be readily seen through the analyzer. This latter with the vernier and nomus fits into the microscope instead of the drawtube. The analyzer or scale can be so adjusted that when the nomus points to 0° the two semidisks will be of an even neutral violet tint. In this position it is fixed with a screw. The tube is then withdrawn and the glass container

with the urine is screwed in, when the whole is replaced. In looking through the instrument it will now be seen that the two semidisks are no longer of neutral tint, but one is red and the other blue. On rotation this inequality of color will disappear at a certain point, and when the neutral violet tints are again seen, the angle is read off. With this angle you can refer to the accompanying table and read off the amount of sugar present in grains contained in one litre, or by dividing this by ten the percentage will be arrived at. I have used this little instrument a great many times and find that it is quite as accurate as the larger and more expensive apparatus.

It is my custom to make about six readings, which is very rapidly accomplished, and take the mean thereof by dividing the sum of the readings by six. With some practice and an eye trained for color the results come generally within one-tenth of one per cent. of the amount of sugar present. Like every other instrument, it requires practice to get good and accurate results. While for those who have to make many quantitative determinations of sugar in urine the polarizing saccharimeter offers great advantages, I quite agree with Dr. Tyson that, for single and isolated determinations, Fehling's method is quite as rapid and certainly as reliable. The general use of the polarizing saccharimeter together with its advantages and disadvantages, and also the preparation of the urine for that purpose, have been so fully explained by Dr. Tyson, that there is nothing further for me to add.

ICHTHYOL IN SURGERY.

BY EDWARD MARTIN, M.D.,

INSTRUCTOR IN OPERATIVE SURGERY, UNIVERSITY OF PENNSYLVANIA.

[Read January 25, 1888.]

ICHTHYOL was first described by Schrötter, and used in the treatment of skin diseases by Unna. It is obtained as a clear yellow-brown oil by distilling bituminous matter found in Tyrol, and containing the fossilized remains of fishes and marine animals. By the action of sulphuric acid on this distillate, and subsequent neutralization with soda or ammonia, either the sodium or ammonium sulphichthyolate is produced. The latter compound is preferred by Unna.

The ammonium sulphichthyolate is a reddish-brown, clear, syrup-like liquid of burning taste and odor, soluble in water, making a clear red-brown solution; also soluble in equal parts of alcohol and ether.

The ichthyol preparations are characterized chemically by their richness in sulphur (ten per cent.), so intimately united that it can only be extracted by complete decomposition (Lartigueau); they easily take up oxygen, acting as powerful reducing agents (Baumann).

Clinically, the ichthyolates are described by Unna as being powerful antiphlogistics, causing anæmia and rapid subsidence of swelling in all tissues. This antiphlogistic effect is ascribed to the drug's action on the endothelium of the bloodvessels depriving it of oxygen in virtue of its reducing properties, and contracting the lumen of the vessels. This explanation is not, perhaps, entirely satisfactory, but physiological studies have not yet given us a better one. The cornifying effect of the drug on the epithelium of the rete is undoubted.

Surgically, what are the indications for the drug?

Lartigueau states that it is indicated in all subcutaneous and inflammatory tumefactions, œdemas, vascular dilatations, incipient furuncles, and local manifestations of rheumatism.

Elliot praises it highly in burns of the first and second degree (five per cent. solutions in water), as producing rapid subsidence of pain

and inflammatory symptoms. He finds its application to obstinate varicose ulcers associated with eczema rubrum (sodium compounds, three to five per cent.) at times productive of marvellous results. In his hands it is also useful in cicatrices, and in a few cases of rheumatism and neuralgia has given immediate and marked relief from pain.

Schweninger states that in rheumatism, lumbago, ischias, tic, gout, and migraine, local applications of ichthyol act more powerfully in allaying the pain than any known medication.

Lorenz is astonished at the fabulous efficacy of the drug. In acute and chronic joint rheumatism, acute muscular rheumatism, mastitis, panaritis, and contusions, a few rubbings with pure or fifty per cent. ichthyol compounds are peculiarly successful in allaying pain and hastening healing. In chronic and acute joint rheumatism relief often follows a single rubbing, while this is the rule in acute muscular rheumatism. The pain of gout disappears, the shining red skin becoming quickly wrinkled. A beginning mastitis or panaritis is always aborted, or if fully developed the pain is much relieved. Its prompt use prevents the discoloration following contusions. It immediately allays the pain of a burn, and prevents blistering. Finally, a ten per cent. solution hastens the cicatrization of badly healing ulcers.

Loring dilutes with water when the pure ichthyol compound cannot be borne and prevents irritation of the skin by careful washing and drying before each application.

Von Nussbaum states that a single application of ichthyol one part, water four parts, lanolin five parts, has allayed the itching of eczematous ulcers which had resisted all known applications for weeks and months, and promptly brought about rapid cicatrization on being continued a few days. Arthritic pains, which for weeks have made day and night miserable, are relieved at times in one-half minute after the application of a strong ichthyol ointment. In erysipelas it produces results obtainable by no other means, namely, the immediate arrest of the disease. Von Nussbaum's treatment was first the thorough disinfection and drainage of the wound, then, if the disease continued to extend, over its whole surface a thick layer of ichthyolate and vaseline, equal parts, was spread and covered by a layer of ten per cent. salicylated cotton. The erysipelas advanced not a line further and in a single day the swelling disappeared and the red, shining, puffy surface became yellow, brown, and wrinkled. This remarkable effect von Nussbaum ascribes not to the influence of the drug on Fehleisen's cocci, but rather to a change

produced in the tissues by virtue of which they cease to favor the growth of the microorganisms.

Stelwagon has had excellent results in the abortion of furuncles by ichthyol preparations.

Agnew (D. Hayes) considers the ichthyol preparations more powerful than any known therapeutical agent in bringing about reduction of inflammatory enlargements, and has had particularly good results in recently enlarged lymphatics. He uses sulphichthyolate of ammonia and iodide of lead, equal parts, applied generously and covered in by oiled silk.

The writer has used ichthyol in—

(1) Six cases of cervical adenitis, with absolutely no relief; cure being subsequently brought about by iodine or the knife.

(2) Fifteen cases of marked inflammatory induration of the subcutaneous tissues, with invariably a speedy and in some cases almost magical reduction, and this after other means had been tried unsuccessfully.

(3) In two cases of furuncles without good effect.

(4) In one case of cellulitis without marked effect till the knife was used (in this case staphylococci were found, but no chains).

(5) In four cases where pain was the most marked feature of inflammation, with complete relief in three and no effect in the fourth.

(6) In one case of erysipelas of the scalp, with immediate cure.

The latter is so striking that it is reported in full:

B. C., bartender, æt. thirty-six; full-blooded Irishman. Struck on the head by a bottle whilst intoxicated, December 20, 1887. Two slight wounds of the scalp, to which no dressing was applied. 22d. Chill, fever, nausea, great pain in the head, and swelling. Went to a clinic; wounds were opened, disinfected, and catgut drainage provided; symptoms progressive. He was seen by the writer on the second day of his fever, the fourth from the infliction of the wound. No sleep for two nights. Pulse 106; temp. 103°. Violent headache; whole scalp puffy, cedematous, and very tender; a few drops of thin pus squeezed from wounds. Cover-glass preparations of blood from puncture by tenotome showed Fehleisen's chains. A saline purge and iron were ordered internally. On the scalp was placed a thick layer of ammonium ichthyolate and vaseline, equal parts. The pain was relieved almost immediately; the patient slept comfortably; his temperature the following morning was 98°, and he was and remained well.

This is not different from the results obtained by Nussbaum.

With the exception of the case of erysipelas, the writer used a ten per cent. ointment of ammonium ichthyolate in lanolin, fearing lest, in the case of stronger applications, his effects might be ascribed to

counter-irritation. It is possible that stronger preparations would have proven efficacious in the treatment of adenitis in which the weak ointment signally failed.

The extravagant praises bestowed by some authors on ichthyol savor more of proprietary advertisements than scientific contributions, and the variety of affections for which it is recommended might well make one doubtful as to its complete efficacy in any single instance.

An analysis of the cases in which it has proven serviceable will show, however, that they can be relegated to one of two classes :

1. Affections characterized by inflammatory enlargement.
2. Affections characterized by pain of peripheral origin, probably depending on inflammation or congestion.

For either of these conditions, theoretically, a powerful antiphlogistic would be indicated, so that the clinical indications for the use of the drug correspond to its alleged therapeutic effect.

When the surface is irritated, weak solutions (three to five per cent.) should be used ; but when the skin is intact and the subcutaneous tissues are to be affected, pure or one-half strength ointments give the best results. In using strong preparations the skin should be washed with soap and warm water, and thoroughly dried before each application. Ichthyolates can be combined with any of the ointments, or can be dissolved in water.

The writer's success with the drug, even where it was not used in the most efficient manner, has convinced him that the praise bestowed on it by the Germans is well merited. Where suppuration has actually taken place the weak ointment is not of service, but in the allaying of inflammatory pain and the resolution of subcutaneous induration (excepting adenitis) the results are most satisfactory.

SOME INTERESTING SEQUELÆ OF A CASE OF SCARLET FEVER, WITH PATHOLOGICAL SPECIMENS.

By A. J. DOWNES, A.M., M.D.

[Read January 25, 1888.]

ON November 15, 1887, at 3 P.M., I was asked to see B. M., a boy of seven years, then under the care of a homœopath, and said to be dying of heart disease. I called immediately. The boy was comatose, had been so for twelve hours. The face had a characteristic pallor, the eyelids were slightly puffy, the pupils dilated, the breathing stertorous.

On listening to the heart I heard a loud systolic apex murmur, a diastolic one at the right base, and mingling with both a peculiar whistling sound, the cause of which at the time I did not understand. Examining further, I found that the eyelids had become puffy two days previous, that the feet and ankles were swollen, and the scrotum slightly so. No urine had passed in twenty-four hours. Excepting a few scybala, forty-eight hours before, the bowels had not moved in seventy-two hours.

The child had scarlet fever five years before. I told the father that the boy did have heart disease, but that he was dying of uræmia. Shortly after 5 P.M. he died. The following morning Dr. Martin Rively and myself made a post-mortem examination. The specimens I show are the heart, kidneys, and a piece of the liver.

So advanced cardiac lesions in a child of this age are far from common. The ventricles are both hypertrophied and the cavities dilated, the right considerably. The curtains of the mitral valve are thickened and fibrous, the posterior leaflet is exceedingly contracted and shows above it a recent inflammatory area. The aortic curtains are a beautiful picture of an insufficient valve. The whistling sound I heard during life must have come from the tricuspid valve. The hypertrophy of the muscular elements of the ventricle, with the marked distention to which the cavity was subjected, surely allowed sufficient leakage to cause this sound.

On account of its late recognition and its undoubted influence in enhancing the cardiac condition the state of the kidneys is exceedingly interesting. Even macroscopically the kidneys show changes which must have been going on for some time. The pale cortex and the eversion of the cut edges indicate fat. Under the microscope we find evidence of long existing changes, sufficient to warrant the assumption that in the long-ago attack of scarlet fever the kidney changes began. The tubules are swollen, distorted, and full of

casts. The epithelial cells lining them are somewhat granular and smaller than normal, with their nuclei becoming indistinct. Long existing changes therefore. We find also recent conditions.

The glomerules are swollen and congested, and in their vicinity an infiltration of small indifferent cells. A very characteristic glomerulo-nephritis of recent date was the cause in this case of the anuria and consequent uræmia. The history points to this, for the boy, although not well for a few years back, was comparatively so. For two weeks previous to his death he was confined to his bed, and undoubtedly during this time he was suffering from a glomerulo-nephritis which, adding itself to an already damaged kidney, precipitated an attack of uræmia.

Additional proof that the boy's kidneys were not normal prior to his last sickness is not wanting. His bladder, post-mortem, contained about two ounces—twenty-four hours' urine—of this I collected one ounce. It contained a large amount of albumen but no sugar, round and columnar epithelial cells showing fatty degeneration, a few epithelial casts containing oil globules and some free oil. A few weeks' nephritis could not cause this urine.

The liver changes are secondary to the heart condition. Under the microscope it shows both fatty infiltration and degeneration.

In concluding, I would recall the points that interested me in the case. *First.* The extensive cardiac lesions caused by scarlet fever occurring in a child under two years. *Second.* The late recognition of the heart, the non-recognition of the kidney condition. *Third.* The occurrence of acute inflammation—the glomerulo-nephritis almost typical of scarlet fever—in an already damaged kidney. *Finally.* May I not call attention to this case as showing to what extent the sequelæ of scarlet fever may advance when not recognized and treated. And the history of the case proves such to be the fact. Eight homœopaths in succession had charge of the boy for four years prior to his death. Over a year ago one had diagnosticated diabetes. The one in attendance before my visits had recognized valvular affection. But the kidney lesions had escaped them all. Apparently this proves that the case ran an almost natural course.

A CASE OF NEPHRECTOMY FOR GUNSHOT WOUND.

BY H. A. PRICE, M.D.

[Read February 8, 1888.]

Maggie McG., of Avondale, Chester County, Pennsylvania, aged fourteen years, white, pale, anæmic girl, was accidentally shot on Wednesday, December 21, 1887, at 9 o'clock in the morning while handling a four-barrelled Sharp's pistol, 30 calibre. She had the muzzle of the pistol turned toward the right side; while attempting to raise the lock with the thumb of her left hand it slipped from her hold and fired the cartridge, which entered her body at the junction of the ninth rib with cartilage, passed directly through the left lobe of the liver, entered the upper third of the kidney, and passing through lodged in the deep muscles of the back near the spine. When we first saw her—twenty-four hours after the accident—her condition was an exceedingly alarming one: pulse 150; temperature 103°. She had passed, soon after the accident, a large quantity of blood from the bladder. But at the time of our seeing her she was not passing blood from the bladder, showing that if there was still hemorrhage it was into the peritoneal cavity, and also that the bladder was not wounded, for the urine was normal.

Symptoms of peritonitis were well marked; abdomen considerably distended. We had no difficulty in coming to a conclusion as to what was best to be done. Dr. Charles Penrose and myself at once advised the removal of the kidney. This was concurred in by Dr. Hudders and Dr. Ewing, the attending physicians. The patient was etherized and opened. A large quantity of clotted blood was removed from the abdomen, the wound of the liver was examined, both entrance and exit. No hemorrhage was found coming from it. The abdominal incision was then enlarged, and the blood removed from the region of the right kidney, when it was plainly seen that the hemorrhage was from that organ. The kidney was examined and found to have a hole in its upper third, large enough for a finger to enter. I then made a button-hole opening through the peritoneum with scissors, introduced finger and enlarged the opening by tearing, and without much difficulty enucleated the kidney from its bed. The ascending colon was pushed back or inward toward the spine, and the opening in the peritoneum, through which the kidney was removed, was made in such a manner that the vessels of the bowel were not disturbed. The ligaturing of the pedicle was exceedingly difficult, Dr. Penrose having to tie the ligature the full length of his hand in the peritoneal cavity. Two ligatures were applied, one through the pedicle tying it in halves, the other, a large, heavy ligature with one knot; then the

kidney was cut away and the ligature tightened before making the second knot. The stump of the pedicle or button, as it is called, to keep the ligature from slipping, had a portion of kidney structure in it. There was complete irrigation. A glass drainage tube was left in the kidney wound and the abdomen closed. The patient rallied nicely from the ether, and, on the morning of the second day, Epsom salts was given in large and repeated doses, but could not be retained. On the morning of the third day, a second attempt was made to have her bowels moved. Rochelle salts was used, followed by two or three evacuations and passage of flatus by the bowels, which gave great relief. Patient did uninterruptedly well, with temperature not over 102° up to the time (eighth day) of the removal of the glass drainage tube, when rubber drainage was substituted and was left too long, producing quite a rise of temperature and fetid pus at the bottom of the tube, which was at once relieved by the attending physicians removing tube and cleaning drainage track.

On January 4th was telegraphed for, patient's temperature having been up to 103° the previous night. Abscess was suspected either in the liver or the muscles of the back. I met Dr. Hudders and Dr. Ewing, her attending physicians, in consultation and found no positive indication of abscess—the girl being in a moderately good condition at the time, with a slight tendency to diarrhoea—temperature 100.4° ; pulse 100. She continued to do well until the 11th of January, when Dr. Ewing wrote me. "Some new trouble seems to be developing in our patient, her temperature is 103.4° , her liver is enlarged and tender; complains of pains in left side and shoulder." On the 12th there was quite a gush of pus and bile from the drainage tube opening—about two ounces; this at once relieved her of high temperature and quick pulse. She has had many changes in the last three weeks, with slight discharge of bile and pus from the drainage tube, but has constantly, but very slowly improved. I am greatly indebted to her physicians, who have given her every attention; nothing but their interest in the case could compensate them for their labors. For the result in this case I am greatly indebted to Dr. Charles Penrose, for assistance rendered during the operation. Length of incision six inches. Kidney removed for hemorrhage.

DISCUSSION.

DR. EWING, of West Grove: I have nothing to add, except that the condition of the patient is better than Dr. Price states. To-day there was only a drachm of pus discharged. There is refreshing sleep; temperature is normal in the mornings, though there is a slight evening rise; appetite is good; the bowels are regular. I feel that recovery is assured. This child was on the verge of death when the operation was done—the pulse was 150; temperature 103° ; the extremities were cold; the body covered with clammy perspiration. Improvement was manifest at once. I am personally much indebted to Drs. Price and Penrose for this operation, and I attribute its

success to the neatness and dispatch with which everything was done, exhibiting a high order of skill.

DR. J. B. ROBERTS: The case speaks for itself. While I cannot speak from experience, it has occurred to me, and the same suggestion has been made by others, that the difficulty of tying the stump so far down and behind the peritoneum, might be lessened by getting the kidney enucleated and then twisting it so as to apply torsion to all the renal vessels, veins as well as arteries. Afterward the ligature might be applied with more ease, and this whether abdominal or lumbar incision be made, though in the absence of experience I judge that it would be easier to do this with a lumbar incision. I presume that there was no intestinal wound in this case, no mention having been made of any.

In connection with the operation by lumbar incision, I might refer to an error of my own which illustrates the mistakes our lack of familiarity with operations in this region may lead us into. The operation was undertaken for a supposed stone in the kidney; but as no stone was found, it resolved itself into an exploratory incision and acupuncture of the kidney. The ordinary lumbar incision had been made with care, and I had come upon the kidney with ease. It was suggested that I should enlarge the wound upward and explore the upper end. A few muscular fibres stretched across the upper angle of the wound, and these I divided by a small cut, when a rush of air into the pleural cavity informed me that I had cut a small hole in the diaphragm. The accident did no harm; it was easily remedied with a few sutures; and the dyspnoea that persisted for a few days was attributed by the patient to the tightness of the abdominal bandage. I was not sufficiently familiar with operations in this region to realize to what extent the posterior attachment of the diaphragm to the vertebræ dips down here, especially when I saw, as I did, the main mass of the diaphragm bulging down as a great sheet in front of the point where I made the additional incision.

The PRESIDENT: How does Dr. Price account for the bile?

DR. PRICE: I cannot say where the bile comes from, except the liver. The wound in the liver is about two inches from the gall-bladder. The ball took a diagonal course and came out at the margin of the liver, and then entered the kidney. I do not know what the effect of twisting the pedicle would be. I could bring the edge of the kidney within an inch of the wound. I consider the abdominal incision the proper one. In this case there were several considerations in its favor. Hemorrhage had already taken place into the peritoneal cavity; it gave us the chance to examine for wounds of the liver and intestines. We found only wounds of the liver and kidney. The liver was not bleeding, and we had only the kidney to deal with. In view of the discharge of pus from the liver, I now believe that it would have been better to insert into the track of the bullet in the liver a small glass drainage tube—this of Bantock's, which is of about the same diameter as the ball—and drained it. If, as has been stated to me by Dr. Wood, there has been no case of recovery from bullet-wound of the liver, we are not going to make the prognosis any worse by draining, and I think we might make it better.

A CASE OF NEPHRECTOMY FOR PYONEPHROSIS.

By FRANK WOODBURY, M.D.

[Reported February 8, 1888.]

In connection with the case reported this evening, I will briefly relate the notes of a case of nephrectomy performed for me by Drs. Deaver and Agnew, last year, at the German Hospital:

The woman first came to me in the spring of 1886, for vesical irritation, with bloody urine. She had had several such attacks following exposure to cold and wet some two years previously. In September of the same year there was another attack. The urine contained pus, but no blood. I washed out the bladder with boric acid and alkalies, and subsequently with a weak solution of nitrate of silver. The pus continued, epithelial tube-casts appeared, and a tumor slowly developed in the right side. Dr. Deaver saw the case in consultation and concurred in the diagnosis of pyonephrosis of right side consecutive to inflammation of the bladder. Dr. Agnew saw the case on December 25th, and agreed in recommending operation. On January 10, 1887, nephrectomy was carefully and skilfully done by Drs. Deaver and Agnew. Death occurred five days later, from exhaustion.

DISCUSSION.

DR. DEAVER: The steps of the operation were lumbar incision, which exposed the kidney closely adherent to all parts, especially to the under surface of the liver and to the iliac vessels. It was distended with pus, six ounces being evacuated prior to its removal. The mass was very large, and to deliver it without wounding the peritoneum required great care. I now regret that we extirpated, as I believe it would have been better surgery to incise the kidney, wash out the abscess cavity, insert a drainage tube, and to dress it antiseptically as in nephro-lithotomy.

Much difficulty was experienced in ligaturing the pedicle, as in Dr. Price's case. I believe the abdominal incision to be preferable in dealing with greatly enlarged kidneys. In performing the abdominal operation, the meso-colon descending, instead of the internal meso-colon, which carries all the

bloodvessels, should be divided, thus avoiding the danger of gangrene of the gut. Delivery is easier, and better access is given to the adhesions, especially those to the iliac vessels.

DR. J. B. ROBERTS: The case of Dr. Woodbury suggests some studies I made and reported to the American Surgical Association a few years ago. Something can be gained in the way of diagnosis in the early stages of perinephritic abscess and other lesions in this region by the study of certain trains of symptoms, pointing to the localization of the disease. Inflammatory affections about the upper end of the kidney, for example, will often show on careful examination a limited pleuritis; when the lower part is involved, there is apt to be spasm of the psoas muscle with flexion of the thigh; in the middle part, pressure on the renal vein and other vessels may cause an otherwise inexplicable albuminuria.

SPECIMENS EXHIBITED.

DR. C. B. PENROSE presented a specimen of

DERMOID CYST OF THE OVARY.

The woman also had a uterus filled with many subperitoneal and interstitial fibroids, and a large blood cyst of the other ovary.

DR. PENROSE reported a case of

OBSTRUCTION OF THE BOWEL BY CANCEROUS MASS; OPERATION, WITH FORMATION OF ARTIFICIAL ANUS.

The operation was performed seven days ago. There had been complete obstruction of the bowel for twenty-eight days prior to operation. Fecal vomiting occurred two days before operation. At time of operation there was immense abdominal distention, a temperature of 101° , and a pulse of 150. An abdominal incision four inches in length was made, revealing complete occlusion of the descending colon by a cancerous mass twelve inches long, involving also the meso-colon.

Resection was made of the gut and meso-colon, and all indurated tissues were removed. The two ends of the divided gut were brought together laterally and united to each other, and the long axis of the abdominal incision, with continued suture, so as to make an artificial anus. A bucketful of fluid feces was discharged immediately after the operation. Relief was immediate; quiet sleep lasted for thirty-six hours. To-day the abdomen is flat; the pulse is 80 to 90; temperature 99° ; there is no pain; the tongue is clean; appetite good, and the patient doing remarkably well.

APEX EXPANSION VERSUS PURE AIR IN PULMONARY CONSUMPTION.

By THOMAS J. MAYS, M.D.,

PROFESSOR OF DISEASES OF THE CHEST IN THE PHILADELPHIA POLYCLINIC.

[Read February 22, 1888.]

NEXT to the tubercle bacillus, impure air stands most prominent among the many agencies which have been assigned as the causes of pulmonary consumption. Innumerable plans and methods have been devised and proposed for improving the ventilation of our dwellings, hospitals, and workshops; volumes upon volumes have been written on the ill effects of breathing vitiated air; and the immaculate freshness of the country and mountain air has come to be universally regarded as a certain guarantee against pulmonary consumption. These, like many other popular notions, contain a germ of truth, but actually are delusive, inasmuch as they exaggerate the effects of a small evil, and afford a false sense of security against the real source of danger in the production of this disease. This we shall endeavor to show in the following pages.

At the very outset we desire it to be well understood that we do not in the least underrate the value of fresh, wholesome air in the prevention and treatment of pulmonary consumption; and while it is probably true that, on the whole, country people enjoy greater immunity from this disease than city people—though this is not proven on account of a lack of adequate statistics—yet we are convinced that the purity of the atmosphere plays a very small part in bringing about this probable result. If we are permitted to make a homely, hypothetical proposition, we will state that if two individuals who respire the same quantity of air, and who are equally well off so far as heredity, food, clothing, warmth, comfort, etc., are concerned, were both enjoined to maintain a sedentary and a stooped position of their bodies for an unlimited period, one inside of a house and the other outside in the open air, we have no

reason for believing that the one inside will fall a victim to this disease sooner than the one on the outside.

If it were true that this disease is the result of breathing a vitiated and impure atmosphere, how can we account for the fact that the inhabitants of Iceland, Greenland, Lapland, and of other cold countries of the north, who live in dwellings which are notoriously wanting in ventilation, are practically exempt from this disease? Of the Icelanders, Mr. Warnford Lock,¹ who is very familiar with these people and who speaks their language, says that their life is

"one long exposure to the elements, and during the night they live in dwellings devoid of ventilation, and which, if not buried beneath the earth, are built of turf and often become grass-grown, a very bad feature being the excessive stuffiness of the common living and sleeping room, where, owing to the absence of fires, the greatest possible crowding and plugging are necessary in order to maintain a tolerable degree of warmth."

And yet Dr. Cullimore,² from whose work the above quotation is taken, says (p. 73)

"that consumption in Iceland is never indigenous, but is always, when it does occur, imported from abroad and but seldom extends to the second native generation."

On the other hand, it may be stated that the people of the tropical regions of the globe, who enjoy an uninterrupted revelling in pure, fresh air, both day and night, winter and summer, are by no means free from pulmonary consumption. The only difference, so far as the physical life of these two classes of people is concerned, is that the warm climate, which produces such a luxurious atmosphere, also creates a tendency to physiological sluggishness and an indisposition toward physical exertion among its inhabitants; while the people of the cold and rigorous north are compelled to maintain the warmth and vitality of their bodies in great part, by day, through physical exercise, of which their occupations of hunting, fishing, herding, etc., give them a full share. It is also well known that miners and laborers employed in coal mines, who continually respire an atmosphere which is not only loaded with impurities, but is damp and musty, suffer but very little from this disease.

One fact which lends color to the belief that pure air is such an essential element in limiting the ravages of consumption, is that those who occupy elevated or mountainous regions are less liable to this

¹ The Home of the Eddas. S. Low, 1879.

² Consumption as a Contagious Disease. Ballière, Tindall & Cox, 1880.

disease than those who live near the sea level. Thus Fuchs shows from extensive data that

"at Marseilles, on the seaboard, the mortality from this disease is 25 per cent.; at Oldenburgh, eighty feet above the level of the sea, it is 30 per cent.; at Hamburg, forty-eight feet above the sea, it is 23 per cent.; while at Eachevege four hundred and ninety-six feet above the sea level, it is only 12 per cent.; and at Brotterode, eighteen hundred feet above the sea, it is but 0.9 per cent."

Carrying this line of observation further, it appears very probable that consumption is almost unknown among any native people who live more than 6000 feet above the level of the sea.

Now that which concerns us here chiefly is the reason why mountain climates are, as a rule, so free from pulmonary consumption. Is it because the atmosphere is pure and free from septic germs? This is hardly possible, for if it were true that the aseptic condition of the air played any very prominent part, why should the Icelanders, who nightly reek in a most filthy atmosphere; or the dwellers along the Nile, who, according to Mr. B. Phillips, live "in huts where the pure air has neither ingress nor egress, except through a small hole near the ground;" or the coal miners, who continuously respire a foul and poisonous atmosphere, all be comparatively free from this disease? Is it due to the general absence of humidity? We think not, for Bogota, the capital of the United States of Colombia, located on the Andes, near the equator, and at an elevation of over 9000 feet, is said to be entirely exempt from this disease, although dampness prevails to quite a large extent. We think there is much reason for believing that it is principally, if not entirely, on account of the attenuated condition of the atmosphere, and shall, therefore, at once proceed to consider the physiological influence of high altitudes on the human body.

It is estimated by Dr. Denison that at an elevation of 6000 feet the surface of the body is relieved of nearly 7000 pounds pressure. When such an enormous weight is lifted from the body it is quite evident that its interior must also be markedly affected—the pulse is accelerated from fifteen to twenty beats per minute; the respiration is quickened from ten to fifteen breaths per minute; evaporation from the skin and lungs is increased, and the amount of urine is diminished. These are some of the immediate effects. Protracted residence in such a high region enlarges the chest capacity. The Quichua Indians, who dwell on the elevated table lands of Peru, have enormous-sized chests, containing capacious lungs with large air cells. The Mexican Indians possess chests which are out of proportion to the sizes of the individuals. Dr. Denison says that children born in the Rocky Mountains have

chests of unusually large capacity, and M. Jaccoud states that at St. Moritz the respirations are not only more frequent, but fuller.

The reason why the number of respirations increase while ascending a high elevation becomes clear when we take into consideration the fact that at the sea level a cubic foot of dry air contains about 180 grains of oxygen, while at an elevation of 6000 feet it contains only about 106 grains—nearly twenty-five per cent. less than the body is accustomed to breathe at or near the seaboard; therefore, in order to supply the wonted amount of oxygen to the body, the respirations must either increase in number or in extent. From all accounts it is very probable that respiration becomes accelerated only during the early period of exposure to such an attenuated atmosphere, and that subsequently this function becomes slow again because the air penetrates more deeply and completely into lung tissue but little utilized before.

That man does not suffer under such a deprivation of oxygen is evident from what we know to be true of his lung capacity under ordinary conditions of life. Prof. Mosso has recently proven experimentally that man possesses a lung capacity which is nearly one-fourth larger than the actual necessities of life at the sea level demand; hence by employing his whole lung capacity he can extract a sufficient amount of oxygen from this attenuated atmosphere without difficulty. And herein lies the secret why so many consumptives, and others with weak lungs, derive such a great benefit when they resort to a mountain climate. It may be trite, but it is nevertheless true, that all consumption practically begins at the lung apices, because these parts are habitually inactive. They are inactive because, in the first place, the bronchial tubes are so arranged that they conduct the air with greater facility to the base than to the apex of a lung, and, in the second place, because the lung is larger than necessary; hence the base, which is filled most readily, is filled first, and the apex, if at all, toward the end of inspiration. The apices, therefore, become the superfluous parts of the respiratory organs. It is quite different, however, when the body is immersed in a highly attenuated atmosphere. Every available space in the chest is now brought into requisition to furnish the needed amount of oxygen, the apices are called out of their lethargic state, and the alveoli are inflated, and if the infiltrated areas are not dispersed the surrounding alveoli are kept permeable, and so the disease is, at least, limited and called into abeyance.

This statement is corroborated by those who have had large experience in the climatic treatment of pulmonary consumption. Thus

Ruedi reports¹ "that of 600 consumptives under his care at Davos, expansion of the thorax took place in no less than 584." Dr. Denison says² "the increased circumference of the chests of consumptives after undergoing the high-altitude treatment is shown in many of Prof. Weber's, as well as in my own, cases." Dr. Lindsay, in the work already quoted, states (p. 32) that

"Davos does not cure consumption by its sunshine, or the purity and dryness of its air (although these conditions undoubtedly coöperate in the beneficial effect), but mainly by the rarefaction of its air, which stimulates respiratory activity, promotes healthy expansion and soundness of tissue in the lungs, and hence aids them to resist the spread of morbid deposits."

So much, then, for the immunity which is afforded by mountain climates; but that which is of still greater interest to us is the fact that those who follow active employment are less liable to this disease than those who pursue sedentary and quiet occupations. Thus M. Lombard found

"in Paris, Geneva, Vienna, and Hamburg, that there are a greater number of persons leading a sedentary life afflicted with phthisis than of those leading an active life, in the proportion of 141 to 89. In the Brompton Hospital the relative liability was found to be 63 per cent. of indoor males to 30 per cent. of outdoor, and all the consumptive females followed indoor occupations. Dr. Guy found, in the close workshops of a printing establishment, the compositors, whose employment is sedentary, fell victims to phthisis in the proportion of 44 per cent. to 31½ per cent. of the pressmen, who, although breathing the same air and in every other respect subject to the same habits of life, differ only in the active bodily exercise which the press imposes on them; and among the same class of operatives the deaths from the same cause did not exceed 25 per cent. in those who use exercise in the open air." (Ansell.)

There can be no doubt, too, that those of our Indians who are still allowed to obey their roaming instincts of hunting and of fishing, or to follow their vocation of farming, which a number have, owe their immunity from this disease, which we know they possess, in great part, if not entirely, to the physical exercise which they obtain in this manner; while those who are subjected to the idle and improvident reservation life die rapidly from it, principally because they are deprived of their wonted exercise. This is of special interest to us here, because it has such a direct bearing on the main point at issue. Some of the former class of Indians, like the Pimas, for example, who may be called wild, although they are agricultural in their habits, are living

¹ Climatic Treatment of Consumption, p. 62. By Dr. J. A. Lindsay.

² Rocky Mountain Health Resorts, p. 85.

in half-underground huts with very little or no ventilation, yet, from all accounts, consumption is an exceedingly rare disease among them.

Thus far we have seen that, on the whole, those who occupy elevated habitations, as well as those who follow active exercise, are more exempt from the disease under consideration than those who live near the sea level or those who live a life of quietude. In connection with this we will consider the influence of physical exercise on the lungs, and endeavor to ascertain how it affords protection against consumption. During physical exercise more oxygen is consumed by the muscles, and more blood and air circulate through the lungs than during rest. Just how much more air enters the lungs during activity than during rest can easily be estimated when it is known that during inactivity a man breathes 480 cubic inches of air per minute, and while walking at the rate of four miles per hour, or while tramping a treadmill, he breathes 2400 cubic inches, and if he walks at the rate of six miles an hour he takes in 3260 cubic inches of air per minute. The difference between 480 and 2400 cubic inches of air-capacity shows that during the exercise of walking even at the rate of four miles per hour, five times more lung surface is thrown into action than during rest; which proves very conclusively that bodily activity possesses a marked influence in determining the degree of lung expansion, and that under such conditions regions of lung will be called into service which are never fully reached by air during bodily rest.

This is in entire accord with what practically exists. Thus Darwin¹ says that the lungs in improved breeds of cattle, which naturally take little exercise and are domiciled much of the time, "are found to be considerably reduced in size when compared with those possessed by animals having perfect liberty," and Waldenburg² states that the vital lung capacity is smallest in persons who lead sedentary lives, such as professional men, students, clerks, etc., and is greatest in those who follow active outdoor occupations, such as sailors, recruits, etc. Chassagne and Dally, in their joint work on the *Influence of Gymnastics on the Development of Man*, report that at the Military School of Gymnastics of Joinville-le-Pont, out of four hundred and one individuals subjected to gymnastic exercises for five months, three hundred and seven, or seventy-six per cent., showed an increase on an average of two and one-half centimetres in the mammary circumference of the thorax. According to Dr. Abel, seventy-five per cent. of those who practise gymnastics in Germany experience an increase in the meas-

¹ *Animals and Plants*, vol. II. p. 361.

² *Pneumatische Behandlung Respr. u. Circul. Krankheiten*, p. 119.

urements of the chest. There can be no doubt that the principal reason why consumption increases with the advent of civilization is that everything in civilized life tends to produce physical inertia in our bodies. Walking is substituted by riding in carriages and in cars; manual labor is in great part replaced by machinery; active outdoor labor is supplemented by quiet indoor occupations—in fact, everything which tends to produce physical activity is exchanged for a life of ease and indolence. The American Indian, as has already been stated, is known to be comparatively free from the disease in his wild state, but as soon as he acquires the habits and customs of civilized life he becomes its victim.

In converging the two lines of reasoning which have been thus far developed in this paper, it appears that the immunity from consumption which is established by residing in a mountain climate, and by practising physical exercise, is chiefly brought about in the same manner, viz., by increasing the capacity of the chest. And from a practical point of view it is of some moment to know whether the former has more weight in bringing about such restoration than the latter—or, in other words, whether those who live in high altitudes continue to enjoy this exemption if they refrain from active physical exercise and take up a sedentary occupation in such regions. From recent inquiry into this subject we are inclined to believe, at least so far as the Rocky Mountains climate is concerned, that as soon as outdoor pursuits are exchanged for sedentary indoor occupations, consumption increases in frequency. It is, therefore, quite certain that physiological exercise plays a more important part in the problem of the prevention and cure of consumption than a residence in an elevated or mountain climate, however valuable the latter may be. We have, moreover, good reason for believing that the immunity which is established through physical exercise is more permanent in character than that which is secured through residing in a mountain climate, for it is a common observation that consumptives flourish only in high altitudes so long as they remain; a protracted stay at the sea level is always regarded as perilous. Such consequences are in perfect harmony with what one would be led to apprehend from a knowledge of the physiological factors involved in the restoration of the patient. These factors are entirely local, and their influence does not extend very far beyond their immediate dominion. This objection does not hold good in regard to physical exercise. One thing may be said, however, in favor of mountain climates which is not true of physical exercise, viz., it produces its beneficial results without conscious effort on the part of

the individual ; therefore, when the remedy is viewed from a standpoint of ease and comfort, and not from one of permanence, the mountain climate is to be preferred.

In discussing the influence of mountain climate it must not be overlooked that, on account of its rarefaction, it increases the circulatory and cellular activity of the body, and in this way undoubtedly aids the process of nutrition ; yet even this influence cannot be denied to physical exercise, although it is brought about in a more direct and positive manner.

While increased chest capacity is, therefore, the great desideratum in preventing and treating consumption, we have the strongest evidence for believing that it is not so much a question of developing the base of the lungs as it is one of expanding the apices. This is well shown by the fact that the civilized female, although she has on the whole much less chest capacity than the male, yet, owing to her increased costal expansion, which has been cultivated through the protracted influence of tight lacing, she is less liable to pulmonary consumption than the male.¹

Pulmonary gymnastics.—Such, then, are the comparative effects of mountain climate and of physical exercise in the treatment of pulmonary consumption, and it now remains to be shown how the effects of the latter can be obtained without resorting to those of the former. Reference has already been made to the fact that muscular effort increases respiratory motion, and in taking up the question of pulmonary gymnastics it is not our purpose to discuss those exercises only which have a direct influence on the chest capacity, but also those which, through the body, have an indirect influence on the pulmonary organs. In all exercises it is very important that none should be carried to the extent of decided fatigue ; and that, whenever possible, the body and head should be kept erect, the shoulders thrown back, and the lungs thoroughly filled with each breath ; that breathing should only take place through the nose ; and that sufficient food is taken during the intervals.

Bodily exercise.—The power of walking is common to most people, and its influence on the lungs, as we have seen, is very marked. It is regarded of great service even by those who exclusively advocate the utility of high altitude treatment. Dr. Brehmer, of Görbersdorf, according to Schreiber, was the first to prescribe, for consumptives,

¹ Female Dress as a Determining Factor in Pulmonary Consumption. Thomas J. Mays : *Med. News*, Jan. 7, 1888.

walking up a gradual ascent. A semi-daily walk of half an hour or an hour, either on the level or on a slight upward grade, is of immense advantage to the invalid. Running, dancing, skipping rope (especially when the rope is swung backward), bowling, etc., are to be highly recommended. Whatever the mode of exercise may be, it must be performed under as little compulsion as possible. One reason why the above named exercises are so conducive to health consists in the fact that the excitement which they induce is so attractive that the consciousness of muscular effort is lost.

Among the many indoor exercises the following movements are very valuable. The arms, being used as levers, are swung backward as far as possible on a level with the shoulders during each inspiration, and brought together in front on the same level during each expiration. Or the hands are brought together above the head while inspiring, and gradually brought down alongside the body while expiring. When a deep inspiration is taken in accordance with either plan and held until the arms are gradually moved forward or downward, or even longer, the process of chest expansion is materially enhanced.

Another very effective exercise is to take a deep inspiration, and during expiration only the patient, in a loud voice, will count as long as possible. A male person with a good chest capacity can count up to sixty or seventy, while in a female with ordinary lungs this power is somewhat reduced. Practice of this sort will gradually develop the chest, and the increased ability to count is a measure of the improvement going on within the thorax.

Many of these movements may have their effects greatly enhanced by the use of dumb-bells, chest weights, etc., which are made especially for the purpose.

Compressed and rarefied air.—The breathing of compressed and rarefied air is attracting wide attention at the present time in connection with pulmonary consumption, and is another most useful method whereby the chest capacity can be markedly improved. Nearly four years ago Dr. Cohen, the honored President of our Society, advocated the substitution of compressed and rarefied air for a change of climate, in a paper which he read before the American Climatological Association. Here he says:

“In many cases fully as much good can be secured by this treatment as by change of climate, and in a few much more; though, in the vast majority of cases in which change of climate is advisable, it is but a poor substitute.”

There can be no doubt that compressed and rarefied air is inadequate when used alone in many cases, but when combined with pulmonary

gymnastics and other judicious treatment, we are not sure that the results obtained are inferior to those which are derived from climatic treatment. Recent experience has shown us that when consumptives, who had spent one or two winters on the Rocky Mountains, or on the Pacific Slope, without benefit, were subjected to the use of compressed and rarefied air in association with other pulmonary exercises, such as are above described, their improvement became marked and decided. On the whole, our experience with the air treatment, combined with pulmonary gymnastics, has been very favorable, and we think that this is in consonance with the observations of others. Thus the late Prof. Flint, in his work on *Phthisis*, says (p. 406)

"it does not appear, from the analysis of my cases, that changes of climate have in a marked degree a beneficial influence, as compared with the hygienic measures available at home.

We believe, however, that, as a rule, these measures are applied too infrequently to be of the greatest service; and, therefore, insist that the pulmonary gymnastics be repeated every hour and a half during the day—the first thing in the morning and the last thing at night—and for from fifteen to twenty minutes at each time; and that the air inhalations be given at first twice, and in the course of two or three weeks gradually increased to four or five times a day, and even oftener. It is very true that this method of treatment involves more labor and perseverance on the part of the patient than is required in a high mountain climate; but then it is a question whether the patient is not more than compensated by the consciousness that a separation from friends is unnecessary, that the heavy expense, the dangers and discomforts incidental to travel are avoided, and, above all, that the improvement which may take place will be persistent and be practically unaffected by a change of residence.

Now, after reviewing the whole subject, we are driven to the conclusion that the line of immunity from consumption, which, in the early history of our country, was located at the Atlantic seaboard, and which has gradually receded westward with the tide of civilization, until at present it has reached the latitude of Colorado, will not stop in its course until it touches the shores of the Pacific; that the question of curing the disease does not depend on the purity or freshness of the air, or upon the number of bacilli which the atmosphere may contain, or upon the amount of oxygen which may be introduced into the body—for these are all secondary considerations; but it is simply a mechanical question—a question as to the best mode of expanding

the lungs, and especially the apices of our round-shouldered and flat-chested patients, of removing the infiltrated products already existing, and of enhancing the constitutional resistance.

DISCUSSION.

The Chair, DR. W. W. KEEN: These are very practical questions presented for discussion. Change of climate involves expense, separation from friends, interruption of employment. Can we obtain equal benefits by home gymnastics or change of employment? There is also a novel question raised as to purity of air. These points should be discussed.

DR. WILLIAM OSLER: The last statement of the paper contains a very important truth. With imperfect expansion there is a liability to clogging of the interstitial circulation in the apices and accumulation of tissue *débris* which may afford a nidus for the development of the bacillus tuberculosis. The condition of activity of this interstitial circulation differs very much in different individuals. We know but little yet of the conditions which determine the development of tuberculosis. In part, at least, it is like the old parable of the seed and the sower: the nature of the soil will favor, retard, or prevent the growth. That the bacillus of tubercle will not grow in every soil is demonstrated by autopsies in large general hospitals. At Blockley, we will find in every hundred sections, say, fifteen or twenty cases with the usual lesions of phthisis; in fifteen or twenty there are no excavations, the lung not extensively tuberculous, but at the apices are small areas of induration, caseous nodules, and a few peripheral miliary nodules. The soil has not been congenial, and the development of the bacillus was restricted. Without bacillus, no tuberculosis; and that opinion is shared by ninety-nine out of every hundred clinicians of the day.

DR. EDWARD MARTIN: While connected with the department of physical education at the University of Pennsylvania, I had an opportunity of studying the effect of exercise on chest development. Lads admitted with narrow lungs and supraclavicular depressions suffer, after moderate exertion, with embarrassment of pulmonary circulation. The right heart is congested and there is evidently blocking of the blood current in the lungs. After six or eight months of carefully regulated exercise, there is a change in the local condition; no more obstruction is offered to the right side of the heart than elsewhere; the bloodvessels respond to the extra demand put upon them. With this free circulation goes an increase of chest girth, from an inch to two or two and a half inches in six months. Inspiratory exercises are nearly always given these young men, especially those with that shape of chest which we are taught predisposes to phthisis. Among these exercises is prescribed deep breathing, with or without movement of the arms. The arm is raised from the body to a right angle by the deltoid. After that the lifting is done by the serratus magnus, the most important external inspiratory muscle. As the arm is carried nearer to the head, the insertion and origin of the serratus are approximated and the muscle works at a disadvantage. For

this reason expiration is practised as the arms are carried up, and inspiration as they are brought down. Exercise should be made vigorous enough to stimulate the heart action. Slow motions, as a rule, do not strengthen the heart muscle, but have a local effect, whereas the object in these cases is to make the circulation free and the air tubes pervious.

DR. C. W. DULLES: Dr. Mays has done good service by calling attention to the fact that the conditions to secure which consumptives are recommended to live at high altitudes can be replaced by simple measures. My observation, though limited, corresponds with that of Dr. Mays, and I think that all of us have been struck with the fact that there is no direct ratio between the percentage of cases of phthisis and the breathing of impure air. We often see a number of persons huddled into small, unventilated rooms, with filth and drink and all the factors of disease, and yet apparently in blooming health. In such cases the men, who are engaged in active employment, and the children, who run about in the streets, enjoy better health than the women, who have less active exercise and who bend over washtubs or sewing work.

DR. GEORGE E. SHOEMAKER: I heartily agree with Dr. Mays that apex expansion is an important part of the treatment of incipient lung disease. A very important point is raised as to the action of rarefied air in expanding the apices. In localities that are warm, moist, and low—like Florida, for example—there is no such effect, and almost the sole benefit, as far as the climate is concerned, is from the patient's ability to be outside all the time. Now would it not be better to send more of our patients to a climate where direct good is gained by the more thorough ventilation of the lungs, reserving for Florida the very weak and those liable to excessive hemorrhage or to heart failure? In regard to impure air, we must remember that many of those persons who enjoy good health in spite of their home surroundings, live out of doors most of the time, the children, in particular, living upon the doorstep or in the street, except in stormy weather. In the same way at mountain and seaside resorts, the small and uncomfortable rooms drive visitors out into the air; and whether or not ozonized or rarefied, it is pure, out-of-door air.

DR. MAYS: It is rather unfortunate that Dr. Osler did not confine himself to the topic of the paper and discuss the main points of the subject in his usual able manner. I purposely avoided all except an incidental reference to the bacillus; but I must now say that I cannot accept the dictum, "no bacillus, no tuberculosis." It seems very strange that if the bacilli need a soil in which to develop they should be able to penetrate into that portion of the lung which is hardly ever expanded in phthisical patients. Why, if you take the two sexes and put them side by side in the same employment, do the men become diseased in greater proportion than the women? Why this fondness of the bacilli for one sex? I must also dispute the point that ninety-nine of every hundred clinicians accept this dogma. Though born in Germany, the doctrine is already losing ground among the Germans.

I wish, in conclusion, to make a statement which I should have embodied in the paper, that, according to the latest researches, the apices expand more in the recumbent than in the erect position; therefore, a person inhales more air during sleep than in waking hours.

AN IMPROVED OBSTETRIC FORCEPS.¹

By WILLIAM S. STEWART, A.M., M.D.,

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OF PHILADELPHIA.

[Read February 22, 1888.]

It is not my intention to consume the time of this Society by giving a history of the origin and use of the obstetric forceps, nor to enter into a general discussion of its merits or demerits.

I take it for granted that there is a large majority admitting their necessity, and the great benefit they are to the lying-in patient. Therefore, I will content myself in endeavoring to point out the advantages of having parallel handles, so that the application of either blade first can be made at will, as the exigencies of the case may require.

It is in order to meet this necessity, which I have more than once experienced, that I have the honor and privilege of presenting for your consideration an instrument which will demonstrate its superiority, and consequently can be relied on in almost any emergency.

The improvement is not restricted to any special form of blade, but can as readily be applied to the straight as to the curved, its use being equally effective with either form.

The first object, for which I was most solicitous, was to be able to have an instrument which could be used readily in presentations where it might be desirable to apply the second blade first, as sometimes in the second position of the head when jammed into the cavity of the pelvis and rotation to the antero-posterior diameter has been prevented by a narrow, contracted passage. In all such cases there will be no difficulty in applying and adjusting the first blade; but, occasionally, it is impossible to apply the second in this condition of the presentation, the only remedy being to reverse the order by applying the second blade first, running the risk of injury to both mother and child in the recrossing of the handles, in order that they may be

locked before making traction. This we have overcome by having the handles made parallel to each other, and without overlapping, as in the ordinary instrument. Each handle has its own independent lock, the two being connected by a plain bar, which will admit of adjustment no matter which blade is applied first.

To overcome the danger of slipping, and to secure the grasp on the foetus, it was necessary to devise some method of reversing the direction of the handles, in order that traction could be applied. To accomplish this a double lever was devised, one part on each handle, and each working on the same pivot or fulcrum; to this the traction is applied, resulting in a power perhaps superior to anything we could have expected.

The compression to the foetus is no longer in proportion to the power in the grip of the hand applied to the instrument, as in the cross-handles, but is regulated simply by the resistance to be overcome, and beautifully illustrates the mathematical relationship between the force and the resistance; consequently, all fear of the slipping of the instrument is obviated, and the only force that is necessary to be applied is for the delivery of the foetus, serving at the same time for compression and traction.

The compression, however, is controlled by a shoulder which is made on the toggle-joint, preventing any risk to the child, and its limit corresponding to the position of the blades of the cross-handled instrument when the handles are in apposition.

Should there be any irregularity of application, and consequent difficulty in locking, we have devised a coned hub with a winged nut, which though the handles may be at an angle of twenty degrees, enables us to adjust them accurately.

The advantages of this improvement, as experience has demonstrated, are summarized as follows:

First. The application of either blade first.

Second. The impossibility of the slipping of the blades when properly applied.

Third. Moderate and even compression, the degree of compression being regulated by the amount of resistance.

Fourth. Greater facility for making traction.

DISCUSSION.

DR. LONGAKER: The only advantage of this modification of Dr. Stewart's is that the forceps is not so likely to slip. This is due to the parallelism of the blades, which is maintained even though the blades be not on opposite sides of the child's head, and in very large heads where it is difficult to recross the handles. There is in existence another device for the same purpose, a very simple one, a mortise lock at the end of the handle. Personally, I think the forceps introduced by Sir James Y. Simpson cannot be improved upon.

DR. PACKARD: I ought, perhaps, to speak with some diffidence on obstetrical matters, as my practice in that line has of late years been but limited. Yet I cannot but recall the teachings of Professor Hodge, and the extremely practical instruction given the students of my day by Dr. Joseph Warrington, which found abundant confirmation in my experience.

We were taught that the forceps should never be applied unless the os uteri was dilated or dilatable; that they should be introduced with the utmost gentleness, the surface of the child's head being the sole guide; that ready locking (and no force was ever to be used to effect this) was the test of proper application; that under no circumstances was any leverage to be exerted by means of the mother's tissues; that the left hand of the operator (applied at the lock, the tip of the forefinger against the child's head, to detect any slipping of the blades) should be the fulcrum, the instrument being then used as a double lever, so as, by a gentle swaying motion from side to side, to coax the child's head through the passage. This side to side movement was strongly advocated afterward by the late Dr. Albert H. Smith, whose experience and authority in such matters must be conceded.

Under all circumstances, except in certain abnormal positions of the child's head, the blades were to be applied with their long axes parallel with the occipito-mental diameter; and they had to be accurately opposed to one another in order to lock.

Now, it seems to me, in the light of my own experience, that the difficulty of recrossing the handles ought not to be such as to render a special mechanism needful in order to avoid it. And I cannot but think that the deviation of the blades from parallelism, however brought about, involves danger.

When the mother's forces are inadequate to effect delivery, I think the time has come to use the forceps; and to obviate the necessity of a long-continued grasping of the handles, they may be tied together with a handkerchief, or with any other convenient band, as soon as the blades are accurately applied to the head. The compression so made is often necessary to the delivery; and on several occasions I have myself felt the bones of the head give way under the grasp of the instrument, but the mother was unharmed, and the children lived.

As to forcible traction, I have heard of the child's head being torn off; I have several times seen a strong man brace himself with one foot against the bed, and apply his whole power to drag the child from the mother. In one case I have known this practice to result in the tearing away of part of the

cervix, laceration of the vaginal wall, and permanent damage to the mother's local and general health.

In the old style of forceps—and the Hodge pattern has always seemed to me the best—we had in each blade, used singly, a vectis; in one handle a blunt hook, an instrument often of great value; the other was a sharp hook, covered, when not in use, with a steel cap screwed on. Such a combination of instruments, which is very convenient in a practice involving long distances, cannot be, or at least is not, offered in the forceps presented by Dr. Stewart.

DR. GEORGE E. SHOEMAKER: While this instrument is, no doubt, safe in Dr. Stewart's hands, it might not be so in those of others. That toggle joint is a very powerful mechanical appliance, and the "shoulder" does not limit its action until the blades are quite close together. A moderately large head would not let them get so near together, and a very violent and harmful compression would result from even moderate traction upon the handle.

DR. STEWART: In reply to the first speaker, among the original forceps as represented in the older works, were those with parallel blades, but I do not know of anything like this instrument. Of course, I do not claim all the credit of this invention, but share it with the instrument maker, who carried out my ideas. I was induced to have such an instrument made because of a number of complicated cases which came under my care, especially a difficult one in which I was called to assist a friend, who had been trying all night to get on the second blade of the forceps in a very narrow pelvis, where the child's head was jammed in the right iliac region, and would not rotate. I advised using the second or female blade first, which we did with precaution in recrossing the handles, and the delivery was speedily effected. I am not anxious to use forceps or to make lacerations. My rule is not to apply instruments as long as there is any rebound of the head.

There need be no fear of the toggle-joint permitting the blades to approach too closely, as the shoulder can be adjusted to any desired distance. It is new to me that a fetus can be delivered without traction. If a wedge is all that is wanted, the toggle-joint is a better wedge than the cross-joint. The amount of compression is regulated by the necessities of the case. If the mother is left alone, she compresses the head of her child in her labor. In the cases (eight) where I used this instrument, I could not find a trace of its mark twenty-four hours after delivery. I would never use a handkerchief to tie the handle. I believe that in cases of contracted pelvis where other instruments could not deliver, this could. I had such an experience with a manikin, in which the outlet was too narrow, failing with the cross handles I delivered with my instrument.

A CASE OF MACEWEN'S OPERATION FOR THE RADICAL CURE OF HERNIA, FOLLOWED BY A SPEEDY RETURN OF THE HERNIA.

By W. W. KEEN, M.D.

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[Read February 22, 1888.]

I THINK it important to report failures as well as successes. Macewen's operation, also, has been so generally successful that it is the more important to report the failure of this case as the immediate result of the operation seemed to promise a cure; but, as you will see, the hernia has quickly reappeared. For the notes of the case I am indebted to Dr. Lambach, the Surgical Resident.

The patient is a man thirty-two years of age, a fresco painter, but for some time at work dredging oysters. When seventeen years old he first noticed a right oblique inguinal hernia, for which he wore a truss for a year and then laid it aside. The hernia remained cured for thirteen years. A year ago, while at work dredging for oysters, the hernia returned, and descended into the upper scrotum.

He entered St. Mary's Hospital on the sixth of January, 1888, on account of the distress and inability to pursue his occupation. The operation was done on the 13th; on the fifth day I removed five of the nine external stitches, and on the twelfth day the remaining four. There was no pus at any time. The highest temperature was 100.2°. He had then two chills, the first on the fifteenth day, his temperature rising to 103°; but as there was no evidence of suppuration, as it yielded promptly to quinine and arsenic, and as his occupation had exposed him to miasmatic infection, we were justified in attributing this to malaria.

He was kept in bed for twenty-nine days—i. e., until February 11th. At this time I examined him, and found the hernia perfectly cured. He was then allowed to get up, a spica and compress being applied. Examining him yesterday (February 21), I found the hernia had returned, with, however, one gain—at the time of the operation the external ring was very large, requiring four double sutures. Now it will only admit the point of the index finger. Moreover, he is exceedingly comfortable, so much so that I doubt if I can persuade him to undergo another operation.

The steps of the operation I will illustrate on this model:

An incision was made over the site of the hernia to its lowest point in the scrotum. With the blunt end of the scissors and the finger, the sac was then dissected from the surrounding parts, care being taken to leave no attachment to the spermatic cord. The index finger then was passed within the abdominal wall, and the peritoneum was dissected for half an inch around the circumference of the internal ring. A moderately stout ligature of chromicized catgut was tied to the lower part of the sac, and a series of stitches taken from the lower portion of the sac to its mouth. This stitch, by means of Dr. Ellwood Wilson's curved trachelorrhaphy needle, was then passed through the abdominal wall from within outward at a point a half inch above and external to the internal ring, the skin being drawn upward and outward so as to allow the stitch to emerge through the abdominal muscular wall, but not through the skin. Then traction was made on this stitch, thus puckering up the sac, which latter was drawn through the ring and rested against the inner surface of the abdominal wall to become adherent there, closing the hernial opening by a firm pad. The stitch was then carefully secured in place.

The external ring was then closed by four double stitches of chromic catgut, passed from side to side.

I was extremely careful in denuding the inner surface of the abdominal wall to get a large raw surface at the internal ring, so as to gain firm union at that point; and the patient was kept on his back for four weeks; yet it gave way a few days after letting him up.

I shall repeat the operation if he is willing.

DISCUSSION.

DR. H. R. WHARTON: I have no personal experience with Macewen's operation for the radical cure of hernia, but I have seen two cases in which Agnew's operation was employed, and three or four in which MacDowell's method was resorted to; these are subcutaneous operations, and do not compare with this open operation in thoroughness. The immediate results seemed good in the cases referred to, but in a short time the hernias were down again. Recent reports from England, though still too recent to allow us to estimate the permanency of the cure, are very encouraging. As to Macewen's operation, I think it one of the best that has been proposed, and if any radical procedure is to be undertaken it seems to promise the best results. Of course, any operation is more apt to be successful in children than in adults.

DR. C. DULLES: I would like to ask Dr. Keen if any appliance other than the bandage was used after the patient began to go about. The hernia looks as if it had been down some time, and not as if it had descended recently. I think it would be best not to trust solely to the strength of the tissues for a little while after these operations. There is a point in the mechanics of hernia which I have noticed, and which I have not seen described by others, and that is, that a patient with an inguinal hernia usually has a pendulous abdomen. I was curious to see if this spare patient of Dr. Keen's would follow the rule, and I saw that he did. I may lay too much stress upon the matter, but I believe that the best appliance is not one which makes pressure over the ring alone, but one which corrects this abdominal outline, and changes the direction of the thrust of the intestines from one at right angles to the plane of the hernial opening to one parallel to its plane. The diagram which I draw on the blackboard illustrates what I mean. Such an abdominal supporter as women wear would answer the purpose, and I believe that it would add to the chances of permanent success after operations for the radical cure of hernia.

DR. KEEN: Of the cause of failure, I can only say that apparently the reparative power did not suffice to obtain adhesion of the sac to the abdominal wall. Why, unless the two chills referred to had some influence, I do not know. The usual practice of those who have had a large experience with these operations has been not to use any truss. I must take exception to Dr. Dulles's diagram. He is right as to the shape of the abdomen, and in correcting it to a more oblique outline, but the pressure will always be at right angles to the abdominal walls anteriorly, and not as he has it here, down into the pelvis. That would, however, correctly express the direction of the rebound. As to the exact time when the hernia reappeared I cannot say. When I examined him, February 15th, four days after letting him up, it was not there. I did not see him again until February 21st, when I found it had reappeared. I shall not wait long before repeating the operation. He wants to be earning wages, and I do not want to burden the hospital with any patient longer than necessary. Any danger will have passed over in a week or two, and I will then operate if he consents.

DR. DULLES: When we bear in mind the comparatively mobile state of the contents of the abdomen, we must see, of course, that the intra-abdominal pressure is exerted in all directions, and we might draw any number of arrows to indicate it; but there is only one direction of "*thrust*," which is the resultant of all the lines of pressure; and by supporting the abdomen, as I suggest, by a firm and comparatively unyielding support, we turn the direction of that thrust into a line following the axis of the pelvis, and take it off the ring.

ON THE IMPORTANCE OF PRIMARY SUTURE OF DIVIDED NERVES,

WITH AN ILLUSTRATIVE CASE OF SUCCESSFUL SUTURE OF THE
MEDIAN AND ULNAR NERVE.

BY CHARLES B. NANCREDE, M.D.,

SENIOR SURGEON TO THE EPISCOPAL HOSPITAL, SURGEON TO THE JEFFERSON MEDICAL
COLLEGE HOSPITAL, ETC.

[Read March 14, 1888.]

ALTHOUGH I have a most profound faith in the *vis medicatrix naturæ*, I still think that Dame Nature should always have fair play in her battle with injury or disease, and this she certainly fails to receive at the hands of too many practitioners.

In a paper published some fifteen years ago, I contended that, if with such vascular structures as those of the face, which certainly would unite sooner or later in some sort of fashion, we habitually resorted to suture, merely for cosmetic effects, we were all the more bound to do so for such avascular structures as tendons, which, if they failed to heal well, much more if no union was secured, must entail disability or total uselessness of a member. Now-a-days a surgeon who should fail to suture a divided tendon would be considered derelict in his duties. In like manner, I trust, that in the near future the general practitioner will be so impressed with its importance that he will consider that his duty is unfulfilled until he, or some surgeon summoned by him, has sutured any divided nerve.

It is needless for me to dilate upon the evils consequent upon the abolition of function of an important nerve, but I would recall to your minds cases which must have occurred in the practice of most of those present, where divisions of even such small trunks as digital nerves have resulted in troublesome ulcerations, causalgias, etc.

Doubtless the indifference of practitioners to wounds of nerves, or, more strictly speaking, their inclination to "leave them to Nature" has arisen from two causes, viz., (1) the fear that suturing might in

some way determine tetanus, and (2) the well-known fact that nerves divided or even excised with the avowed intention of abrogating their function, too commonly reunite.

The first cause should not deter us, as we now know that a suture, *per se*, can never originate tetanus; while as to the second objection, certain facts which I shall submit for your consideration warrant the conclusion that traumatic divisions of nerves, unless effected by a clean cut—or perhaps ball wounds—involving solely the nerve and little, if any, of the contiguous structures, differ so materially from those purposely effected by the surgeon's knife, that conclusions derived from the result of neurectomies cannot safely be applied to accidental divisions of nerves.

Besides, granting that reunion will occur without suturing, as a stitch can do no harm, why not use one, since it will at least conduce to a more rapid resumption of function? While primary union of nerves with immediate resumption of function—*i. e.*, in a week or ten days, is a surgical rarity, yet it does at times occur, and would doubtless be of more frequent occurrence, if suture were the rule and not the exception.

My aim in this brief note is merely to call your attention, as general practitioners in whose hands many of these cases will fall, to the *duty* of suturing divided nerves as a routine practice, just as you would tie arteries, and to describe a simple, effective method of carrying out the indication.

A critical examination of the histories of nearly all exsections of nerves where reproduction has occurred, will show that they were removed either from a bony canal or from an intermuscular space in which they normally laid, *with the minimum* of injury to the surrounding tissues. Moreover, even when their ends have been turned back and sutured in position or even buried in the surrounding tissues, they have been so secured in the same intermuscular space which the nerve normally traverses. In other words, the bony canals and the intermuscular spaces likewise, act as moulds which direct the course of the reparative material from the proximal to the distal end of the severed nerve.

In extensive wounds, however, this condition does not obtain. Intermuscular spaces are dislocated, large masses of scar tissue are formed, so that instead of the new nerve-tissue being *compelled* to grow in only one, and that the right direction, it has too often an insuperable barrier interposed, and union fails.

In the case which I now show you,¹ the proximal ends of the ulnar and median nerves were directed at right angles to their inter-muscular space, and would have been infallibly fixed between the ends of the torn muscles in a dense mass of scar tissue, resulting in permanent loss of power of the member. In the seventh month after suture—*i. e.*, the usual period required for the degeneration and regeneration of a nerve—first sensation, and then motion returned, until now, although the functions of the member are not perfect, the boy can earn his living, and do nearly all that can be effected by a normal hand and forearm.

Further quotation of my own cases or those of other surgeons seems hardly necessary, and such good results as I here show you have been frequently reported.

Finally, how should the sutures be passed and what should their material be?

Fine aseptic catgut passed by means of an ordinary sewing needle is to be preferred, but fine aseptic silk can be used, and I myself have resorted to this in an emergency. Should the nerve be *very* much lacerated and frayed out, it may, perhaps, be sometimes proper to cut off a portion to gain a clean surface, but this is rarely desirable. The needle should be passed from below upward through the proximal end of the nerve at one border, across and then passed from above downward near the opposite border, entering the needle from an eighth to a quarter of an inch from the cut end, according to the size of the nerve. The needle must now be passed from below upward through the distal portion of the nerve at the border corresponding to the last passage of the needle through the proximal end, across, and made to pierce the nerve from above downward, when the suture will be found to correspond to the free end of the thread in the proximal piece of nerve.

Gentle traction with an appropriate position of the member will, by the tying of one knot accurately approximate the nerve ends; in a word, by this simple method all the advantages of the two separate sutures commonly recommended are obtained with a far greater degree of security. I need not say that the strictest asepsis should be secured, which is easy enough provided the wounded part, the surgeon's hands, and his instruments be strictly cleansed, and the wound be freely irri-

¹ In this patient the brachial artery was also torn through, leaving only a bridge of muscle and skin through which collateral circulation could be carried on. The deficient blood supply possibly explains the failure of the recovery of power in the interosseal muscles, although other of the intrinsic muscles of the hand which are supplied by the ulnar nerve contract well.

gated with the bichloride and tartaric acid solution. If the surgeon gets an uncontaminated wound, it is his own fault if he has suppuration, and even with the ordinary run of accidental wounds, if he will thoroughly scrub his hands with a nail brush and hot water, and likewise so treat the parts surrounding the wound, pour boiling water over his instruments, without any further antisepsis, in most cases healing without suppuration can be secured, while the omission of these details will mar results with gallons of mercuric solution flowing over the wound.

DISCUSSION.

DR. H. R. WHARTON: I have seen one or two cases of primary nerve-suture, though none in which the injuries were so extensive as in this interesting case of Dr. Nancrede's. The results in these cases were good. There is another point to be considered. Shall we attempt secondary suture of the nerves when this has been omitted in the first place? I am very decidedly of the opinion that this procedure should be adopted, for a number of cases have been reported of this character, in which the results have been, at least, good enough to make me feel that secondary suture should be attempted when there is any probability of restoration of the use of the injured part. I thoroughly agree with Dr. Nancrede as to the great importance of this subject.

DR. JOHN B. ROBERTS: The only case of nerve-suture I remember at present is one in my wards, in which the work had very properly been done by the resident immediately on the admission of the patient. It was a rather extensive incised wound of the leg, involving, I think, the musculo-cutaneous and anterior tibial nerves. The muscles and nerves were sutured and dressed antiseptically, and the results were good; though I did not follow the case after discharge so as to make an accurate report as to sensation. Dr. Nancrede has incidentally touched upon a point of great importance, that of tenosuture. It has been my misfortune to meet with quite a number of cases in which this had been neglected by the attendant called at the time of the accident. One of these recently seen was that of a man wounded in the forearm just above the wrist, and in the ring finger. There was loss of flexion of the finger, but it was hard to tell which of the wounds to reopen in order to come upon and suture the divided tendon. The family physician believed it to be the wrist; but after cutting down, I found the tendon here flaccid and intact. I then opened the finger-wound, and here found the tendon retracted into the sheath. I sutured, but did not get a good result, probably from the extent of dissection necessary to get at the tendon in the sheath, and the great mass of cicatricial tissue. However, I never hesitate to reopen healed or partially healed wounds to suture tendons when this very important measure has been neglected.

I have been glad to hear Dr. Nancrede say that with cleanliness of person and of instruments asepsis can be secured without chemical solutions. This

is in marked contrast to one of my friends, a surgeon of prominence, who thinks that the employment of solutions renders care as to cleanliness unnecessary.

DR. J. WILLIAM WHITE: I do not know whether Dr. Nancrede spoke of the resection of the crushed and bruised ends of the nerves. The general principles of nerve-suture are admitted by all surgeons, but the question of resecting lacerated or contused ends before suturing, or of allowing them to remain, is one that should be carefully considered in each case. On the one hand, by resection of any considerable portion we increase longitudinal tension, and make greater strain on the sutures; on the other, we run the risk of including in the stitches tissue too much damaged to recover itself. There is some difference of opinion as to the particular suture to be employed. I should think that the one proposed by Dr. Nancrede, as shown in his diagram, would be open to objection, if, as there apparently represented, it interposes a foreign substance, the catgut thread, between the ends of the nerve; this, if not absorbed, as is sometimes the case even with the best catgut, is liable to be a constant source of irritation, and to prevent union. I prefer and employ a suture passing quite through the nerve above and below the point of union. Evidence, either clinical, or pathological, or experimental, as to the relative advantages of different sutures is desirable, but I do not know of any, and I did not understand Dr. Nancrede to say that there was such evidence.

The CHAIRMAN, DR. W. W. KEEN: There are two cases I may briefly cite from my own experience in connection with the subject of our discussion:

1. A case of primary nerve suture in a boy two years of age, with perfect recovery of motion and sensation. The case occurred ten years ago. The child, carrying a glass bottle, fell, and a fragment of glass divided the ulnar nerve and artery about an inch and a half above the wrist. The mother made compression with her thumb until I arrived, very soon after the accident. After ligaturing the artery, I examined the nerve and found that it had been divided. I had only my pocket-case containing coarse white silk and an ordinary needle. Not wishing to leave the coarse silk in the wound, particularly not in the nerve tissues, I debated as to the method of suture, and devised one which proved eminently satisfactory. Drawing the ends together closely with forceps, I passed a surgical pin obliquely through the two divisions, threw a loop of silk around the point of the pin (as in Simpson's method of acupuncture), drew out the thread, passed it around the head of the pin, where it was secured. At the end of forty-eight hours the pin was removed. The thread was thus loosened and removed. Perfect union of the wound took place in a few days. There was no wasting of muscles, and motion was present after twenty-four hours. While the age of the child prevented exact observation as to the time at which sensation returned, at the end of forty-eight hours there was an exclamation of pain on pricking the little finger with a pin. I saw the father of the boy about a year ago, who told me that his son had perfect use of hand and fingers.

2. Extensive teno-suture, with quick union. A recent case shows the value of even a brief suture of tendons. A man twenty-five years of age was admitted into St. Mary's Hospital with complete severance of all the tendons of the forearm and of the sheath above the wrist. The resident sewed each

tendon carefully. He had only Kocher catgut, which does not remain more than three to five days, and then closed the external wound and placed the hand in flexion on a splint. The man left without permission after a few days, and it seems removed the splint and tore out the sutures in the skin. He returned later with a gaping wound in the forearm, but on testing the fingers separately each finger and each joint was found to have perfect motion, showing that even this temporary apposition of the divided tendons had a perfect result. I should prefer for the purpose, however, either very fine silk, or, better, the ordinary chromicized catgut.

DR. NANCREDE: Dr. White has misunderstood me. There is nothing between the divided ends of the nerve. If he will examine the rough model which I pass around he will see that the nerve is securely and accurately coaptated by the suture. I have no distinct recollection of resecting the injured ends in this case, in fact, I am nearly certain that I did not. In some cases I have said it *might* be desirable, but I am dubious about it. In two other cases that I recall at this moment, I remember that I did not make any attempt of the kind, but brought the ends together as best I could. Referring to the incidental discussion, I am glad to hear that so many of our members always suture tendons. I make it a rule to suture nerves and tendons in every case, and generally obtain fair results.

A CASE OF ECTOPIA LENTIS.

By HOWARD F. HANSELL, M.D.

[Presented March 14, 1838.]

Clarence P., aged ten. This colored boy presents several deformities: A peculiar shape of head, deviation of spine, anterior curve of each tibia, and is more or less undeveloped. I have asked him to present himself before the Society in order that those members who may be interested may have the opportunity to see a case of "ectopia lentis," congenital upward displacement of each lens. The margins of the clear lenses may be distinctly seen about the centre of each pupil. The right lens is dislocated upward. The left upward and outward. Each eye is highly myopic—*i. e.*, as seen through the lens, and hypermetropic as seen under the lens. The temporal side of each nerve shows a large patch of atrophic choroid—post-staphyloma. There is no coloboma of the iris or choroid. With the right eye the boy can read large print only when held two and a half inches from the eye in an upward and outward position. The left eye is useless.

ON THE EARLY RECOGNITION OF EXOPHTHALMIC GOITRE (GRAVES' DISEASE).

By J. MADISON TAYLOR, M.D.

[Read March 14, 1888.]

IN the paper which I have the honor to read to you to-night, I shall not attempt to do more than call your attention to the importance of early recognizing a disorder which often eludes one, to point out certain features which should enable us to do so, and to offer in illustration, very briefly, the salient points in half a score of cases.

Exophthalmic goitre, or Graves' disease, is not a rare malady. At first it is merely a disorder, but frequently becomes a serious disease, and is known to cause death. More often it unfits its victim for active usefulness, or, at least, limits this and sadly disfigures him.

Like certain other ailments the outcome of irregular nervous discharge, what in its incipency is a very manageable complaint, produces in time a disastrous effect upon the tissues, and forms a practically unconquerable disease.

Dr. Jonathan Hutchinson says:

"Graves' disease appears to me to be of the utmost importance, not only on its own account, but as what we might call a type malady. It is the most definite and striking example of which we know, of a severe and protracted malady which, despite its severity and persistence, yet has a natural tendency to recovery."

In reviewing a large number of cases in the search for a complete symptomatic picture, I find that the most constant early feature is sudden and marked evidence of loss of nervous equilibrium. The vasomotor nerves seem quite unstrung. Hence arise flushing, sweating and other skin changes, diarrhoea and transient albuminuria. If at this time a careful watch be kept, I think we should find irregularities in the action of the pupil.

The skin usually loses its healthy hue, grows sallow or dark, and

becomes greasy to sight and touch. This oily look was present in most of the cases I have seen, though I have not seen it mentioned elsewhere. Begbie recounts one case of pigmentation, or bronzing, of the skin; Reynaud calls attention to vitiligo; and Edward Squire, to a discoloration in an isolated instance. The oleaginous appearance seems to me quite constant on face and body. This grows less when salt sponging and belladonna form part of the treatment.

Gowers calls attention to muscular tremor. I have seen this rarely. In Cases III. and V. there is a tremulousness in the voice, which I ascribe to nervousness; yet it is constant.

The emotions become often so overwrought that various mental peculiarities excite apprehension. Or a wiser person may regard the case as one of pronounced hysteria; and, indeed, all through the malady hysteria remains present, more or less, leaving one not seldom in grave doubt.

Frequently delusions occur, and these so closely in unison with the ordinary habits and thoughts of the individual as to render them most difficult of detection (see Case VI.).

Dr. Hilton Fagge warns us to be on the lookout for "slight cases in which one or two of the cardinal symptoms may be absent throughout." Trousseau also insisted on this point.

Von Graefe expresses the opinion that among women it is not rare to find instances of this malady where the only symptoms are disordered action of the heart, not accompanied by valvular trouble or hypertrophy, nor the faulty action of the lid as described by him.

Heart disturbance most often leads the sufferer first to seek medical advice. The pulse is always quick and irritable, usually intermittent. The heart-beats, as a rule, bear surprising relationships to the pulse. Overaction of the heart is well known to be a frequent feature of anæmia and chlorosis. Begbie thinks it a powerful factor in causing Graves' disease. Ross regards the anæmia which is usually present as rather a result.

Throughout the whole vascular system there is a manifest lack of *tone*. So constant is this that it may yet be found competent to explain the causation of the disorder. Certainly the graver features bear causal relation to this state. The vasomotor nerves seem all out of balance; nor can it be confined to one part, though the cervical sympathetic is most prominently involved. There are cases where limited areas not governed by the upper ganglia show derangement, as in a woman now under the care of my friend, Dr. E. T. Bruen, where one side sweats from shoulder to toe, and the opposite eye is

prominent. Arterial tension varies rapidly, and unaccountably; hence the oft complained of noises in the head, amounting at times to terrific roarings (as in Case V.). This may explain the maniacal attacks, as well as blood-spitting, thirst, and transient albuminuria.

The heart itself is rarely diseased. The overaction in time brings on hypertrophy; more commonly, dilatation. It also suffers from the general malnutrition which is noticeable throughout the circulatory system. The small amount of structural damage which this viscus sustains is a matter for remark, however, when the profound functional disturbance is considered. Systolic bruits are commonly heard, even over the auricles and the great vessels of the neck. Dyspnoea is distressing. This at times, even early in the history, alarms one who feels naught else to complain of.

The thyroid enlargement is liable to appear long before the eyes become prominent, but readily escapes attention. It may happen that a sense of constriction is felt when swallowing, especially in men who wear tightly fitting collars. Both lobes are, as a rule, enlarged; but if one only, it is generally the right. When recovery takes place, this badge remains to chronicle the victory.

The eye prominence is late to appear, as a rule, and it would seem to mark the height of the disorder. Before the exophthalmos, there may generally be noted the sign asserted by von Graefe to be pathognomonic, a belated action of the lid in following a downward movement of the ball. Sometimes the lower lid is tardy in following an up glance. This obtrusion of the eyeball is the most picturesque feature, but happily it is not constant, and is often very late. It is of both eyes, mostly, but if of one only, again the right suffers. Sight is seldom affected, except where the outstanding, unprotected cornea suffers hurt or irritation; then opacities may result. If errors of accommodation exist, this correction, in my opinion, greatly aids in reducing the exophthalmos. Fundus lesions are not characteristic; though pulsation of retinal vessels may serve to confirm suspicions.

Knee-jerks are rarely abnormal; often in slight excess.

Electrical examination has been, very recently, shown by Charcot, and confirmed by Vigoroux and Norris Wolfenden, to aid greatly in foretelling the onset of this trouble, the bodily resistance being greatly lessened most peculiarly in this disease. This may prove a valuable aid in diagnosis.

CASE I. illustrates extremely well the more distinctive features other than exophthalmos, which is not present—especially the marked vasomotor disturbance.

Jennie H., aged twenty-three years, single; no neurotic history, intelligent, hopeful temperament; somewhat emotional and talkative. Vague history of a fall at two and a half years, followed by a convulsion, and, from time to time, "fits" are described, but not clearly. At first they seem to have been epileptiform, but later resemble emotional overflow. At fourteen years had typhoid fever, and for twelve months was "weakly." Some swelling of the limbs noticed—then came a period of good health. At seventeen years menstruated first, but not regularly for a year or more. At nineteen years began to work in a shoe factory, in a very exposed room, excessively cold in winter; frequently sat in wet shoes all day long. At twenty years, after a very painful day from cold, walked home in slush, profoundly exhausted: soaked her feet in hot water and went to bed. Then followed a nervous chill with throbbing pain at heart—it beat rapidly; an overwhelming sense of suffocation arose. From that moment the heart has been disordered. Then followed a series of medical pilgrimages to different dispensaries, with small benefit.

I think many of her symptoms were, even then, hysterical, masking effectually her real trouble. She had hæmoptysis, cough, great emaciation, and was treated for phthisis. The fits brought her under treatment for epilepsy. So far as I can learn, no one noticed anything amiss with the eyes or neck. I think there has been at no time exophthalmos, but a peculiar fluctuation in the condition of the pupils, which I infer is not recent. The dyspnoea grew worse steadily, till it became impossible to lie in bed; and for six or eight months she slept fitfully propped up in a chair. In May last a profuse blood-spitting prostrated her for four weeks; soon after the urine was suppressed for three days, with no pain—then a very dark, thick, offensive fluid passed. During the past summer was very weak and thin, but attempted repeatedly to work. Over-exertion at the wash-tub bowled her over again; several hemorrhages followed, and on October 1st she applied to me at the Howard Hospital.

I found a very pale, thin woman, suffering great dyspnoea; respiration 24; pulse fairly regular, 130 to 135; coughing incessantly; carotids throbbing wildly; pupils widely dilated; von Graefe's sign absent. There was complete mydriasis, as we found later, but no fundus lesion. The heart was laboring, loud musical murmur over base; apex beat downward and outward; "bruit de diable" in vessels of neck; thyroid gland enlarged, especially to right side, conveying thrill to hand; neck fourteen and three-quarters inches; skin pale and oily looking, readily sweated, and became chilly; legs œdematous; menstruation had been absent for three years; bowels always loose; urine, small amount, bright red with blood; sp. gr. 1.009; no casts; knee-jerks excessive in both legs; station bad from weakness.

Treatment.—The treatment consisted of carefully regulated feeding and rest; to drink plentifully of flaxseed tea; iron, in form of Basham's mixture, and digitalis, and hot hip-baths; belladonna plasters to the over-excited heart; later, cod oil and bromides, with digitalis. In a week the pupils became responsive to light; cough greatly moderated; the urine only smoky; heart-sounds more defined.

To be brief, in two months the cough ceased; she could lie comfortably in bed; ate well and slept well; pupils became normal; had two or three

"spells"—a little scolding aided these. In six months the girl pronounced herself cured, but she is readily upset by trivialities; twice the pupils have widely dilated on catching a slight cold, and once recently the urine showed traces of albumen. The menstruation was established twice, and slight showing at other times. She can now work at house chores with small fatigue. Pulse about 85 to 95, standing.

CASE II.—Mrs. H., aged about twenty-eight, no neurotic history, two living children, came under my care in 1881 during a miscarriage with adherent placenta. A similar disaster had occurred also some months before. My attention was drawn to a most disfiguring degree of exophthalmos. This had been observed within a few months by a well-known physician, who also warned her that she could scarcely hope again to bear a living child—probably on account of the disorder thus indicated. There was then menstrual derangement and great dyspnoea. Digitalis and ergot were ordered, also care to avoid exertion, but no clearly defined schedule of living. This I supplied and rigidly enforced—insisting upon systematic feeding and rest. I also found an irritable pulse and temper, muffled heart sounds, etc., but very slight right thyroid enlargement, a markedly livid oily skin, sweating surface, loose bowels, and occasional albuminuria.

Under treatment consisting, as stated, of regulated living, digitalis, ergot, along with iron and other tonics, she steadily improved, till in seven or eight months there remained only dusky skin and the eye and lid symptoms. These last I felt sure would improve under use of glasses rightly adjusted—she having a high degree of myopia. After some persuasion this was accomplished with most admirable results, for the exophthalmos materially lessened thereafter.

I may say, as a matter of interest, that I have since delivered this lady of three healthy children at term, each of which she suckled for a full year, and that she now enjoys excellent health. There is no heart trouble, no goitre.

CASE III. *Graves' disease; obscure and abrupt cause; extreme nervousness, cardiac distress; death. No autopsy permitted*—Mrs. S., aged thirty-six, no neurotic history, one child. Two years ago she seemed in perfect health, weighed one hundred and sixty pounds. Happily married, surrounded by every luxury and loving care. Sustained no shock, no fright or exhausting disease. Fell into the hands of gynecic surgeons, who found displacements and tears, and repaired these, as it proved none too well. While sitting in perfect health at a theatre, not in the least excited or especially interested in the play, she suffered a nervous chill and from that time the disorder rapidly grew. The chills frequently recurred, changing to what she described as "waves of feeling up and down the body;" on the slightest exertion sense of constriction in chest, and skin broke into a sweat. Afraid to step about the room. Bowels loose, slept badly, lying awake for hours feeling afraid. The disorder was not recognized.

Sent to Dr. Weir Mitchell with a description of "neurasthenia and heart disease," and through his courtesy I was allowed to see her repeatedly. She was a very excitable, nervous woman, rather thin, weighing one hundred and ten pounds, with a frightened, restless expression. Eyes slightly prominent, some little slowness of upper lid, injection of cornea, tremor in voice, tremu-

lousness of hands on movement, constantly plucking at bed-clothes or handkerchief, or arranging her hair or dress; throbbing carotids, pulse of 125 to 135 lying, and very irregular, loud musical murmur, etc. Bronzed, glistening skin, chilly hands and feet, sweats readily, etc. Thyroid enlarged almost symmetrically conveying thrill to the hand. Some improvement under rest and tonics. Another operation was found necessary, and though slight she sank and died. No autopsy allowed.

CASE IV. *Graves' disease; slight exophthalmos; slight thyroid enlargement; cardiac disturbance; delusions and rapid loss of flesh; cause probably exhaustion from bearing ten children, and precipitated by sharp dysentery; recovery.*—(By permission of Dr. Weir Mitchell and partly under my care.) Mrs. J., aged thirty-nine years, family history good, most favorable surroundings; ten children; began a year ago to lose flesh rapidly during severe dysentery; appetite very poor since. Slight delusions; vertigo. Eyes only noticeably prominent; corneal vessels injected; restless expression; slight tremor; skin clammy and glistening; dyspnoea. Thyroid enlarged a little; heart noisy; no valve defect; very emotional; albumin and muco-pus in urine. Under tonics and rest gained steadily. Referred to me at seashore in summer; rapidly picked up flesh and strength there; gained forty pounds. Now describes herself to be in good health.

CASE V. *Graves' disease; slight exophthalmos; slight thyroid enlargement; cardiac disturbance and tremor; marked improvement.*—Miss R., aged twenty-five, family history good. At ten years had typhoid fever, at eleven very severe dysentery; long in regaining strength; much headache at nineteen years, an illness began by neuralgia in face and marked prostration; noticed rapid breathing; soon eyes were remarked as being "curious looking"; tried to gain strength by exercise in open air. In 1881 again fell ill. In March, 1882, consulted Dr. Seguin, who pronounced unfavorably; at that time had much oedema in legs; ordered digitalis; quiet. Following November grew much better; partly in bed for several months. December, 1883, she saw another physician who relieved the increasing diarrhoea. May, 1881, to May, 1884, menstruated only once; thence irregular till a year ago, since then fairly regular. Weight about one hundred and thirty-five; skin moist and shiny; beads of sweat on upper lip; tremulous lip and tremor in voice, this seems a constant feature; at times tremor in muscles elsewhere. Exophthalmos slight; von Graefe's sign in both eyes; pupils normal; corneal vessels injected; flushes readily; not pale; heart tumultuous; no valve defect; pulse intermittent, one beat in three or seven, very difficult to count. Thyroid enlarged symmetrically; well-marked thrill; loud bruit in right neck; buzzing in head; sweats almost constantly; respiration 28, sighing; dyspnoea great on slight exertion; cannot lie in bed at night; bowels loose.

Rapidly improved in most respects under treatment by regulated living, digitalis, and belladonna; tonics, iron, etc.; salt sponging; hot hip baths; menstruation more comfortable. In January had an attack of nervousness at night time, sense of great pressure in head and flashes of heat over body; ringing in ears. Eyes were examined by Dr. de Schweinitz, who found slight hypermetropic astigmatism; no fundus lesion. Alternate hot and cold water to nape of neck relieved the sounds in head. Is steadily improving to date.

CASE VI.—Miss D., aged twenty-four, family history decidedly neurotic. Mother “queer.” At one year scarlet fever followed by “water on the brain;” soon recovered good health. Menstruated at fifteen.

August, 1885. Dysentery.

December, 1885. Heart began to alarm her. Vertigo sitting or walking; grew weak, short of breath, and extremely nervous; could not sleep, began to groan loudly in sleep, which continued till recently. Skin itches intolerably; sweats readily on exertion. Roaring noises in the head. Legs swelled, also feet—“the buttons were burst from the shoes.”

March, 1886. Neck enlarged. In May the eyes started forward. Appearance: eyes very prominent, sclerotic shows half an inch or more above and below, lids puffed, corneal vessels injected, face bloated and livid; skin greasy. Thyroid enlarged in three directions, most on the right; neck thirteen and three-quarters inches. Heart sounds clear; impulse heaving; slight systolic whirr. Pulse regular, 112 standing. Bowels very loose; tremulous voice. Eyes examined by Dr. Hansell show some accommodative defects, but no fundus lesion. Urine albuminous. Decided delusions. No improvement.

CASE VII.—Miss M. D., sister to above, well-grown girl, well till a year ago, when she had “walking typhoid”; afterward very weak; fainting spells; vertigo on walking; sweats readily; constantly chilly, especially the hands and feet. Buzzing in the ears. Menstruated at thirteen, but extremely irregular; rarely lasts over two days. Eyes showed no lid sign; no exophthalmos. Thyroid enlargement right; neck twelve and three-quarters inches. Heart quick and feeble; muffled sounds; roaring noise over the right clavicle and through the thyroid, also marked thrill. Carotids pulsating visibly. Pulse 128 to 130. Very pale. Is improving.

CASE VIII.—Mrs. S., aged forty-six; mother living, a “fidgety” woman, has two children. Fairly good health till 1881, when she had typhoid fever, followed by large abscess in the abdomen, opened in two places. Treated in the Jewish Hospital. After this shortness of breath began. In 1881 a financial blow greatly worried her; she would sit and brood over her troubles, then the fever. Exophthalmos began, along with diarrhoea; sweated a great deal on both sides. Buzzing in the ears. Appearance: strongly built woman, weight 130 pounds; skin muddy and dusky. Left eye very prominent, right less so; lid signs of both eyes. Carotids throb moderately. Heart sounds clear and distinct; slight bruit. Has been under treatment for eight or nine months. Digitalis and iron and belladonna. Dyspnoea greatest on cold days. Urine at times profuse; no albumen. Œdema of legs fluctuates. Is steadily recovering, though susceptible to fatigue, cold, and shocks.

I hope to discuss the treatment, on which I have some decided opinions, on another occasion. This consists mainly of rest, judicious feeding, tonics, and carefully selected sedative measures.

Competent glasses, too, are essential; at times sharp counter-irritation, especially diuretic remedies and attention to the emunctories. Galvanism, too, has immense value in some instances, but requires judgment in selection of cases.

In brief, whatever measures tend to repair the tone of the vascular system and allay nervous excitability will best bring about gratifying results.

DISCUSSION.

DR. S. D. RISLEY: I would like to ask Dr. Taylor whether there is any indication by which the development of exophthalmos can be expected in cases in which it has not yet appeared.

DR. J. B. ROBERTS: I believe that the great ocular deformity which is so unpleasant to the patient, and attracts so much attention, can be remedied by a very simple operation: merely putting a stitch at the outer canthus, after freshening the edges of the lids, to diminish the optic commissure after the case has made such progress that it is reasonably certain there is to be no further diminution of the prominence of the eyeballs. The patient can be made more comfortable and less conspicuous.

DR. EDWARD JACKSON: The procedure suggested by Dr. Roberts might be resorted to for other than cosmetic reasons. I recently saw a case of this disease, with very great exophthalmos, in which one eye had been lost through sloughing of the cornea due to exposure; and I afterward learned that the second eye had been lost in the same way. Such an accident might be prevented by narrowing the fissure of the lids.

DR. A. V. MEIGS: I know of one person who has completely recovered from this disease, a woman who had a very severe attack many years ago, under the care of my father. The prominence of the eyes, which was very great, is now hardly noticeable, and yet no operation was ever done. I do not think much would be gained by sewing up the canthus, for while the disease is in its acute stage, it is hardly likely the operation would afford much relief, and later, if the patient recovers at all, the difficulty cures itself. I think I know the case Dr. Roberts had in his mind when he spoke, and Dr. de Schweinitz, who has seen the woman in question, will probably agree with me that nothing would be gained by an operation. One thing I have learned of recent years, and it is that it is not necessary in all cases to put the patient in bed. I could mention three or four cases I have successfully treated with tonics and proper regimen, without its becoming necessary to have rest in bed; the cases, to be sure, were not severe. Dr. Taylor speaks of the early recognition of the disease. For my own part, I do not see how a positive diagnosis can be made until we have at least two of the features of the disease present, namely, the cardiac palpitation and some thyroid enlargement; the prominence of the eyes occasionally does not manifest itself, but a diagnosis can undoubtedly be made in its absence.

DR. G. E. DE SCHWEINITZ: I have examined the case that Dr. Meigs refers to, and I saw nothing to be gained by surgery. The eyes were at first very prominent, but they were then receding, and now the normal relation of lids to eyeballs is restored. Inasmuch as there was considerable myopia, and hence not uncommon prominence of myopic eyes to begin with, they will always be more or less conspicuous.

DR. S. SOLIS-COHEN: I have been extremely interested in this valuable paper of Dr. Taylor's, the more so that I think I recognize in his first case a patient whom I have seen, but in whom I did not recognize this disease. She was treated at the Jefferson Hospital some three years ago for anæmia, and was apparently cured. A year ago she returned with the history of "fits" spoken of by Dr. Taylor, and was irregular in attendance and unreliable in statement; the hysterical element so noticeable, probably preventing the careful investigation the case should have received. I consider it the more remarkable that thyroid enlargement should have escaped notice at the clinic in this case, as the comparatively frequent discovery of it at one time, in cases of cardiac and vaso-motor disturbance, has put all the clinical assistants on the lookout for the phenomenon. I can thoroughly agree with Dr. Taylor that vaso-motor paresis plays an important part in the development, if not in the genesis, of this disease. The only case I have seen in the male subject occurred in a young man subject to frequent attacks of flushing of the face, sometimes accompanied with high temperature, in whom the rapidity of the heart's action had led to a diagnosis of hypertrophy of the heart, not warranted by physical exploration. The eyes were not involved at the last time I saw the patient, nor was thyroid enlargement sufficient to attract attention without special examination. I have now under my care in private practice a young lady not at all hysterical, subject to similar attacks of flushing which sometimes leave behind for a short time wheals like those of urticaria: who has also had two attacks of sudden transient blindness, after which all that could be detected in the fundus was moderate congestion; and whose cardiac action, rapid and irregular at these times, is at other times perfectly normal. No organic lesion of any kind has been detected either by me or by more competent observers. It is possible that this may be an early stage of Graves' disease. Improvement has taken place under minute doses of picrotoxin, a drug which Dr. Bartholow has prescribed in cases of exophthalmic goitre, at the hospital, with very good results. One case especially I recall which was associated with purpura. I would like to know whether Dr. Taylor has met with this association. A very interesting case of acute exophthalmic goitre presented at the clinic, which Dr. J. C. Wilson may remember as the subject of one of his clinical lectures; an anæmic young girl affected from childhood with nystagmus, in whom goitre and exophthalmos were asserted to have developed within a short time after a fall from a ladder. She was unable to button her collar, which friends had opened in attending to her after the accident.

DR. J. C. WILSON recalled the case mentioned by Dr. Cohen, but not with sufficient distinctness to add anything of importance to the account already given. Dr. Wilson briefly narrated two cases of Graves' disease, recently seen in his private practice, in which the symptoms developed rapidly after mental shock. The patients were young women. The first, a servant, aged twenty-four, of previous good character, was engaged to be married to a young man who was by occupation the driver of an ice cart. Within a day or two of a visit to her, he was accidentally killed, and her first knowledge of his death came through the newspapers. Cardiac overaction at once developed, and within a month thyroid enlargement, and slight exophthalmos. Under rest and large doses of Fowler's solution complete recovery took place in a

year. The second case was that of a lady, aged twenty, who rapidly developed the characteristic symptoms of Graves' disease after the shock and grief occasioned by the disappearance of a near and loved relative, and the discovery that he was a defaulter to a very large extent. The prominence of the eyeballs was in this case very slight; the other symptoms were characteristic. Under treatment by rest and arsenic decided improvement took place. It is now a month since she last reported.

DR. TAYLOR: In reply to Dr. Risley's query, Does any sign clearly foreshadow the exophthalmos? I can only say that I know of none, nor did I see anything in the literature of the subject to aid us. It usually marks the height of the disorder, though this may be the first feature noticed, especially when it arises suddenly as from shock or overwrought emotion.

To Dr. Meigs' objection that the three classical symptoms can alone and in conjunction constitute the disease, I can only say that it seems to me readily possible to recognize in the peculiar vasomotor disturbances the extreme and unaccountable nervous excitability, the appearances of the skin, etc., the early stages of this disorder. In fact, the object of my paper was to call attention to this very possibility, so that a quietus might be placed upon it at the very beginning if possible.

In the use of galvanism we have a valuable aid in diagnosis, as Charcot and Vigoroux have pointed out, but in the treatment it has not been of greater use than some other measures, though it should always be used in the severer cases. Many of my own patients live out of town, but upon those in reach I use it.

In my endeavor to be brief I did not intend to say much on plans of treatment, leaving that for consideration elsewhere, but rather to speak of early recognition and *early* treatment, which should consist of rest, carefully regulated living, food, and tonics.

GRADUATED TENOTOMY IN THE TREATMENT OF INSUFFICIENCIES OF THE OCULAR MUSCLES. (STEVENS'S OPERATION.)

BY CHARLES HERMON THOMAS, M.D.

[Read March 14, 1888.]

THE study of disorders of the ocular muscles in relation to functional nervous diseases has received a strong forward impetus during the past year, chiefly due to the published results of the labors in this direction of Dr. George T. Stevens, of New York, whose work on *Functional Nervous Diseases*, recently published,¹ has challenged special attention, even where it has not met with entire approval.

The subject occupies a standpoint on the line between the two important specialties of ophthalmology and neurology, it takes somewhat from both, and has already, by force of circumstances, become in a certain sense a specialty by itself.

The operation and its application have, until recently, remained to a remarkable degree personal in the hands of Dr. Stevens, notwithstanding that for many years he has reported it before medical societies and in the medical journals.²

All this, however, has been recently changed by the publication, within the last year, of his work above referred to, which has brought the method into such prominent notice as to compel recognition.

Other operators have now entered the field, among whom is Prof. A. L. Ranney, of New York City, who, as a neurological specialist, has reported³ a series of cases of the gravest neuroses successfully treated by the Stevens' method.

Beyond question a point has now been reached which shows the subject to be worthy of the most sincere investigation.

¹ D. Appleton & Co., N. Y., 1887.

² See articles by Dr. George T. Stevens, on "Chorea" (Medical Record, 1876), on "Anomalies of the Ocular Muscles" (Archives of Ophthalmology, June, 1877).

³ "The Treatment of Functional Nervous Diseases by the Relief of Eye Strain," New York Medical Journal, January 7, 1888.

What I have to present to-night is, to a certain extent, in the nature of a preliminary report; as my work is necessarily incomplete in some particulars, owing chiefly to the considerable length of time required for observation to arrive at a just estimate of the permanency of the results obtained—especially in the gravest and, therefore, most important cases.

I shall attempt to add little that is new to the presentation of the case as made by Dr. Stevens himself, and I cannot hope, in the length of time allotted for its consideration, to make a statement commensurate with its importance, but I have thought it right to rehearse briefly its principal features and to give my own experience in connection therewith, together with a sketch of a few of my own cases; because I have become convinced of the importance of the subject, and also because it has not, heretofore, been brought before this Society,—nor, so far as I can learn, before any other of the medical societies of Philadelphia.

It is now about ten years ago that the operation was first brought to my notice by patients who had been under Dr. Stevens's care. It seemed to me incredible that results such as they claimed were produced in their cases could have been derived from the cause assigned. Again, I questioned the practicability of performing the operation in the definitely graduated manner which was said to be practised by him. Under these circumstances, and in the absence of better information, my position was for a long time one of earnest opposition to the practice in question.

About three years ago, however, having under my care several cases of muscular asthenopia which I was unable to relieve, though I obtained the advice of several of the best known ophthalmologists, and being freshly reminded of the work of Dr. Stevens by a patient of unusual intelligence and reliability, who reported great relief obtained at his hands, I asked his assistance in the treatment of these cases. He kindly demonstrated to me, upon patients of his own, the practicability of the operation, and I became convinced of its great value. The results obtained were so satisfactory that since that time I have investigated the muscular as thoroughly as the refractive conditions in all cases coming under my care, and have as faithfully undertaken to correct them.

For the discovery of abnormality in any of the straight muscles, their physiological condition, both while at rest and in action, and in all states of the accommodation of the eye, must be thoroughly under-

stood. In order that binocular vision may result, the visual lines of both eyes must converge upon the same point, whatever may be the position and distance of the object. It is only under such circumstances that the rays of light are brought to a focus at corresponding points upon both retinæ. A slight deviation results in diplopia, constituting strabismus, a subject sufficiently well understood, and to which Stevens's researches do not directly apply. But while there may be perfect binocular vision, and not the slightest indication of strabismus, there may be, nevertheless, grave faults affecting the recti. It is these faults that Dr. Stevens has emphasized, and to these his observations have been chiefly confined.

In the normal condition of the ocular muscles the visual lines of both eyes naturally preserve an almost exactly parallel direction when looking at distant objects; and they maintain such a position of their own accord from muscular tonicity alone, without the necessity of any additional stimulus. This can be shown by prismatic tests. The artificial diplopia produced in making the test will be such that the two images will lie in that plane which is at right angles to the base of the prism.¹ If, for example, diplopia be induced by a prism placed before either eye with its base directed either outward or inward, the two images will lie in the same *horizontal* plane; and, similarly, *vertical* prisms, with base up or down, will induce diplopia; but in this case the two images will be situated in the same *vertical* plane. The reason for this is because the normal visual lines of both eyes naturally lie in the same *horizontal* and *vertical* planes, even when the powerful stimulus which the need of binocular vision presents is abolished by the prism. Hence, if the eyes in the normal state be directed to a distant object, binocular vision will occur without the need of extra muscular action to bring the visual lines to properly bear upon the object. If, on the other hand, the visual lines of the two eyes do not naturally take the proper position, one of two things will result, either there will be no effort to bring them into correspondence, and strabismus with attending diplopia occurs, or, *more frequently*, by an extra nervo-muscular effort, called into action by the demand for binocular vision, the proper position will be maintained; just as in facultative hypermetropia accommodation is necessary, even when parallel rays coming from a distant object are to be brought to a focus upon the retina. From this forced, though it may be involuntary

¹ Not that Dr. Stevens was by any means the first to employ prisms for the discovery of muscular irregularities, but he appears to have used them with greater precision and by more systematic methods than have heretofore prevailed.

or even unconscious effort to maintain the proper direction of the visual lines, the abnormal conditions under consideration result. We have abundant clinical evidence of the enormous expenditure of nerve force under these circumstances, and of the development of marked reflex disturbances, which are manifested both in symptoms of irritation and of exhaustion.

Dr. Stevens has¹ introduced a series of terms descriptive of the various abnormalities to which the recti muscles are subject. The word *exophoria* designates simply an outward tendency of the visual lines, without implying anything as to which muscle or set of muscles is at fault. The opposite condition, namely, tendency to convergence, is designated by the word *esophoria*, meaning an inward tending.

If either visual line deviates above its fellow, the fact is expressed by the term *hyperphoria*, right or left, as the case may be, always remembering that the lower image represents the higher-tending visual line. It is to be remarked that the condition of hyperphoria is far more frequently productive of serious reflex disturbances than any other fault, and mainly for the reason that a small amount of deficiency in this direction may, and usually does, involve a considerable proportion of the total coördinating power of the vertical muscles; and this because the power of sursumduction is usually limited to about three degrees, while that of abduction is about eight degrees, and that of adduction may be fifty degrees and upward.

The generic term to express any deviation whatever from *orthophoria*, the normal, is *heterophoria*.

Finally, the amount of heterophoria found in any given case is equivalent to and expressed by the degree of the prism required to correct the fault.

In practice, the tests for insufficiency are made by placing prisms before the eyes with their bases in certain definite directions. Lateral diplopia is produced by a prism with base in, vertical diplopia by a prism either up or down. If in lateral diplopia so induced, either image is above the plane of its fellow, we know that the higher image belongs to the eye whose visual line is lowest, to be expressed as hyperphoria of the opposite eye. If, in induced vertical diplopia, either image deviates from the vertical, we have lateral fault—*esophoria* if the diplopia be homonymous, *exophoria* if crossed.

In applying the prism test for the discovery of muscular anomalies it is not sufficient to be content with the results of a single or even

¹ "A System of Terms relating to the Conditions of the Ocular Muscles known as 'Insufficiencies,'" by George T. Stevens, M.D., Ph.D. (New York Medical Journal, December 4, 1886).

several examinations, because we must always bear in mind the possibility of latency—that is to say, like latent hyperopia, the true fault may be concealed or masked. Indeed, as in latent hypermetropia we sometimes have apparent myopia through spasm of the muscle of accommodation, so in actual esophoria an apparent exophoria may be manifest, the result of spasm of the externi, and this is equally true of the other muscles. It is only by a careful consideration of all the circumstances, such as the degrees of abductive and adductive power; and, finally, by the use of temporary correcting prisms for whatever fault may be manifested, and following it up—but not leading it—as it develops, by a new correcting prism until the fault becomes stationary, that we are justified in proceeding to operation. In one obstinate case of exophoria I have several times obtained relaxation of spasm of the interni by a moderate dose of morphia administered hypodermically. But, though the after-results proved the observation under morphia to be expressive of the true condition in this case, there are obvious objections to the use of the drug as a matter of ordinary practice. The discovery of an efficient and safe agent for the relaxation of spasm of the recti muscles is greatly to be desired.

It sometimes happens that muscular anomalies of considerable degree are discovered in connection with refractive faults. By correcting the refractive error first not infrequently the muscular difficulty soon disappears, showing the muscular to have been dependent upon the refractive state. The correction of refractive errors, especially those of a hypermetropic character should always be made before applying the prismatic tests.

Defects of refraction and accommodation are well known as the source of serious reflexes, especially headaches or severe migraine, nausea and dizziness; but it is not so well known that defects of muscular adjustment through faults of the guiding muscles of the eye produce all these and many more serious results besides.

From Dr. Stevens I quote:¹

“Respecting the importance to be attributed to ocular, refractive, and muscular anomalies, I fear that my views will for some time to come continue to be regarded as something more than radical; but I am ready to reaffirm the proposition made years ago, that, among the various elements constituting the neuropathic tendency, these anomalies must be regarded as occupying a preëminent position.

¹ See “Ocular Irritations and Nervous Disorders,” by Dr. George F. Stevens. N. Y. Medical Journal, April 16, 1887.

"Summing up the experience in this field of work, it is shown that, not in occasional and rare instances only, but in a large proportion of cases of the most redoubtable neuroses, unusual and most salutary results may be anticipated from attention directed to visual troubles."

Among the neuroses shown in many cases to be dependent upon such troubles, are to be mentioned neuralgia, spinal irritation and neurasthenia, chorea, epilepsy, and mental disorders. Dr. Stevens further says :

"Not only are those painful or irregular conditions usually described as neuroses in great proportion responsive to the relief from ocular tensions, but a great variety of conditions commonly regarded as local affections yield as readily, and prove that with some possible local complications they are, in fact, reflex phenomena. As an instance of this class of trouble, I may mention the fact that in more than a score of cases of extreme dysmenorrhœa—in each of which the periodical suffering has been of intense character, of regular occurrence, and of the full duration of the menstrual life of the patient—the dysmenorrhœa has failed to occur after relief to the tension of a superior or inferior rectus."

"So far as my experience goes, epilepsy very rarely results from simple conditions. The ocular anomalies in epilepsy are of the most complicated, and often of the most obscure character. A simple insufficiency may induce headache or other minor manifestations, but the ocular causes of epilepsy are usually of a character most perplexing to the surgeon, and sometimes of a character which cannot be completely remedied. Hence, great patience, and, in certain cases, much time and skill are required to accomplish that which can finally be done. If, in the meantime, the patient and his friends are constantly assured by both lay and professional advisers that his efforts must, of necessity, prove fruitless, he is apt to withdraw from treatment, even while defects which are of great importance, are known to exist, and which, by continued efforts, might be removed."

Prof. Ranney is authority for the statement that in cases of epilepsy of long duration under treatment directed to ocular difficulties, the affection has been scarcely less tractable than diseases commonly regarded as easily curable.

As furnishing a suggestion as to the possible method of production of epileptic attacks from eye-strain, it is interesting to note some experiments performed several years ago by Drs. Dercum, Parker, and others in the artificial induction of convulsive seizures. They found that it was possible to produce spasms in many persons by the following method :¹

"The subject being seated, the tips of the fingers of one or both hands were so placed upon the surface of a table as to give merely a delicate sense

¹ See "Artificial Induction of Convulsive Seizures," by Drs. F. X. Dercum and A. J. Parker. *Journal of Mental and Nervous Diseases*, October, 1884.

of contact—*i. e.*, the fingers were not allowed to rest upon the table, but were maintained, by a constant muscular effort, barely in contact with it. Any other position involving a like effort of constant muscular adjustment was found to be equally efficient. Any one object in the room was now selected, and the mind fixed upon it, or some subject of thought was taken up and unwaveringly followed.

"After the lapse of a variable period of time, extending from a few minutes to an hour, and depending upon individual peculiarities to be noted, . . . the subject was frequently thrown violently to the ground in a general convulsion, preceded by tremors which rapidly became more violent.

"Seizures equalling in violence a general convulsion were by no means induced in all subjects, and were generally the result of experiments repeated many times during the same evening. In the experimenters the convulsions became so easily induced that it was thought advisable to desist for a long period."

The *effort of constant muscular adjustment* here spoken of appears not unlike the condition found in the eyes in cases of insufficiency of the ocular muscles; and it seems not unreasonable to infer that if such strain of the muscles of the forearm would produce results of the kind reported by the authors just named, that the strain upon ill-balanced ocular muscles (which must be continuous during the whole of the time that the eyes are opened) should be productive of even more serious, and, indeed, permanent results.

In the great majority of these cases there is but one satisfactory method of treatment, and that is graduated tenotomy. The operation consists in making a small opening through the conjunctiva, exactly over the insertion of the tendon, when the tendon is seized by extremely fine forceps and divided outwardly in each direction, preserving the extreme outer fibres, or, at least, the reflection of the capsule of Tenon, which serves as an auxiliary attachment. Tenotomies for strabismus and so-called partial tenotomies have, of course, long been made, but there are radical differences between these and the operation here described.

The fan-shaped expansion of the tendons of the recti at their points of insertion into the sclerotic are somewhat wider than is generally supposed, while the elasticity of their edges is an influential factor in determining a favorable result in the purpose of the operation—that is, in bringing about a relaxation which shall be permanent by permitting the divided portion to retract and form a new attachment to the globe further back.

The use of prisms as a means of treatment of marked heterophoria is not to be relied on; as in many cases they are found to be insuffi-



BEFORE OPERATION.



ONE WEEK AFTER OPERATION.

cient and disappointing.¹ They, however, have a certain value as means of systematic exercise of the ocular muscles, particularly in the milder cases.

When the correction is made by tenotomy, all that is necessary to be done in a given case should be regarded, in a sense, as one operation, though it may be in several stages and at different periods—as a watchmaker counts the regulating of the watch one operation, though he may be obliged to move the regulator a number of times; or as the correction of an astigmatism is one operation, though it may involve a number of sittings.

In one complicated case I have operated as many as seven times; the first operation nearly two years, and the last a week ago; the net result being an unquestionable gain both in head symptoms, which were at one time alarming, and in the severe asthenopia to which the patient had long been subject. Previous to the operation she had suffered from severe pain in the region of the eyes and in the back of the head, accompanied by general nervous distress of an entirely disabling character. An eminent ophthalmologist declared her to have organic disease at the base of the brain from the appearance of the eye ground. This was about three years ago. To-day this lady assured me that she felt “wonderfully better,” and expressed her entire satisfaction with the treatment she had received.

It is to be reëmphasized in this connection, as an additional caution, that no operation is ever to be undertaken unless the indications for it are positively made out. From a perfectly plain case, evident to the merest tyro, to one demanding the greatest skill and patience of the most experienced, there is every gradation. Nothing would tend more to bring discredit upon the procedure than premature operations, which might result in such disturbance of the ocular muscles as seriously to cripple binocular vision without in the least alleviating the reflex condition for which the operation was undertaken.

Mrs. G. H. C., referred to me by Dr. W. H. H. Githens, aged thirty-two, married, mother of four children. Has suffered for many years from almost constant severe headache combined with a feeling of drowsiness, the seat of the pain being the brow and vertex. Eyeballs painful, always felt better when the eyes were closed. There is frequently double vision, but no manifest strabismus. General condition markedly neurasthenic. Although there was no error of refraction except a very slight amount of hyperopia shown

¹ Since this paper was written a physician of this city—himself an accomplished neurologist—who habitually wears spectacles for the correction of refractive errors and who also suffers from muscular faults, in a conversation with me, said with emphasis, “It is impossible for me to wear prisms. I have tried them thoroughly and know they would drive me crazy.”

only under full mydriasis, the patient was unable to use her eyes at any near work, such as reading, sewing, etc., and at all times suffers from extreme intolerance of light. Ophthalmoscopic examination negative.

Muscular tests. The first examination showed an esophoria of nine degrees, which, under the use of partially correcting prisms worn for ten days, developed into settled fault of twenty degrees of esophoria and twenty-eight degrees esophoria in accommodation.

Tenotomy of the left internus relieved all the muscular fault except one degree, which I have allowed to remain. The relief of all symptoms was immediate and complete. The headache, the pain in the eyes, the intolerance of light, the drowsiness and double vision have all vanished. She is now able (without the aid of glasses) to read and sew as well as anyone, and threading a needle, which, previous to the operation, was almost an impossibility for her, is now done with facility. The general health and spirits have improved to a remarkable extent.

The photographs in her case are from untouched negatives, taken under photographic conditions as nearly identical as possible. The first photograph accurately represents her condition at the time of the operation. The strained look of the eyes, and the high condition of nervous tension are in no way exaggerated. The second photograph was taken one week after the operation, though it might, indeed, have been taken a day afterward—the immediate relief was so great. Perhaps no change in her condition is more marked than that of her tone of voice, which, from being high-pitched, nervous, almost wailing in character, has been moderated, mellowed, and vastly improved. The photograph of this case gives a clearer idea than words can do of the change which may be wrought by operation—in her case a single operation.

As additional graphic illustration of what may be accomplished, I pass around a few photogravure proofs belonging to Dr. Stevens, which he has very kindly placed at my disposal.

J. H. W., thoroughly healthy boy, without any nervous symptoms whatever, has been under my oversight since infancy. Except for a chronic tarsal ophthalmia there was nothing to call attention to the eyes. Very slight hypermetropia, for which I had prescribed glasses several years ago. On examination, three months ago there were eleven degrees of esophoria manifest, for which an operation was performed, removing seven degrees of the fault. Two weeks later four degrees additional were manifested; a week later the total manifest esophoria was nine degrees, when a second operation was performed, resulting in the removal of eight degrees of the nine then existing. A recent examination shows a manifest esophoria of three degrees, being a let-out of two degrees since the last operation.

From the first operation a marked change took place in his facial expression; his eyes, which had been previously been almost closed, opened widely, the tarsal ophthalmia showed prompt improvement, and he expressed himself free from a constant struggle to keep the eyes from closing, which he had not recognized as dependent upon any condition of his eyes until after it had been relieved.

I present the patient this evening for the purpose of demonstrating the amount of set-back given to the tendon, which, though invisible under ordinary circumstances, may be readily seen, upon causing either eye to be rolled outward, as a vertical line in each eye about two millimetres wide in one and a little less in the other, where the sclerotic is plainly visible through the conjunctiva.

Whether the claim made that the neuropathic predisposition is more frequently due to eye strain than to other conditions is fully justified by the facts or not, it is unnecessary at present to determine; seeing that enough is known to make it certain that eye strain from muscular fault is the cause of grave and varied reflex neuroses; and that in these cases carefully graduated tenotomy promises relief; beside there is in such cases always sufficient justification for the sake of the eyes and sight—apart from the nervous condition—for the correction of the fault.

My own experience covers many of these operations, performed for the relief of a variety of conditions, and notwithstanding serious difficulties at times encountered, I have a steadily increasing confidence in the legitimacy and value of the method.

DISCUSSION.

DR. H. F. HANSELL: I would like to ask Dr. Thomas for a more definite statement as to the means of diagnosis. To my mind these are not at all satisfactory. The recognition and the exact determination of superior and inferior insufficiencies are very difficult, much more so, than of lateral defects.

DR. B. ALEX. RANDALL: I have for years taken great interest in the subject of muscular insufficiency, the more so because I have myself been troubled with a defect of the kind, which Dr. Risley corrected for me ten years ago; and with his kind aid, and independently, I have been studying the matter since. As to diagnosis, much has been written, sometimes pretty wide of the mark; and I cannot see that Dr. Stevens has improved our methods. He has brought forward a very nice set of terms for what we have long known, and he has expressed clear-cut opinions which read well. In the same way, Landolt makes out very pretty graphic charts of cases, and marks out well-defined groups, which are to be treated according to certain rules. But the cases which I meet in practice refuse very often to be included in such categories, and very dissimilar cases afford discouragingly similar charts.

I understand from Dr. Thomas's paper that the estimation of defects is largely made with a distant object, presumably a light at twenty feet. To do this we must know the refraction and the accommodation, and I suppose that these are investigated as a matter of course. But it is not safe to take the accommodation for granted. I can myself change my exophoria to

apparent esophoria by the accommodative effort, so-called; and every patient may as readily do the same.

As to correction by operation, I cannot speak like Dr. Thomas from personal experience. We all know that when a certain degree of error is reached it is necessary to operate, and Dr. Stevens places that point very low. His method of operating is highly praised as a delicate one, but the necessity of dividing the operation into many steps is rather unfortunate. However, if he can thus relieve epilepsy, that minor disadvantage may be overlooked. It may be said in conclusion, that except in pointing out that *hyperphoria* is a frequent cause of perplexing and irregular insufficiencies of the lateral muscles (?), Dr. Stevens has added little to our knowledge of the nature of these affections; that in his claims as to their importance, he has gone much further than the experience of equally competent and diligent investigators has enabled them to confirm him; and that in his operative treatment he has merely developed a refinement of the partial tenotomy long in use, as the only means of correcting without overdoing it, the minute deviations from the perfect balance which he deems worthy of operative interference.

DR. THOMAS: Lack of time prevented me from treating at length in the paper of the points as to diagnosis which have been made the subject of questions. There is a variability, and yet, after all, a certainty in these tests which comes as the result of practice and observation. There is an irregularity in the results of the tests from day to day, but after getting the extreme limits of the swing and studying all the circumstances of the case, one is able to strike an average which very fairly represents the error to be corrected. Then a prism is temporarily adjusted to compensate for this error; and thus we make a crucial experiment and are further guided by the effects obtained. A lighted candle at twenty feet, and the dot and line of von Gräfe at reading distance, are *both* to be employed as test objects, and a comparative study should be made of the results obtained—both in the absence and in the presence of accommodation. In this way we frequently get important clues. Sometimes anomalies appear in the action of the lateral muscles comparing the tests at reading distance with those at twenty feet; and when great erraticism of this sort is shown, we may be pretty sure in the majority of cases that we shall in the end find a manifested hyperphoria. Unfortunately, there is no known analogue of the mydriatics which we can well use in these cases, and yet with great patience and watchfulness we shall usually succeed. My results are hopeful in epilepsy, but my operations are too recent to speak positively of cure.

In reply to a question by Dr. Osler, Dr. Thomas said that he had not as yet met with any case of chorea suitable for the operation.

A REPORT OF SOME CASES OF ABDOMINAL SURGERY.

By J. M. BARTON, M.D.,

SURGEON TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

[Read and the Specimens Exhibited, April 11, 1888.]

GENTLEMEN: By invitation of your Board of Directors I submit some specimens, this evening, from cases of abdominal surgery and present the following notes for your consideration:

Abscess of liver. Free incision and drainage; recovery.—George B., aged thirty-eight years, was admitted to the medical wards of the Jefferson Medical College Hospital, July 29th, under the care of my colleague Dr. Neff. The patient was suffering with an immense abscess of the liver, extending the area of the percussion dulness to below the umbilicus and to the left of it. At the request of Dr. Neff, I removed by aspiration more than a quart of "brick-dust" colored pus, with such relief that the patient was able to return to his home in the interior of the State. The abscess cavity rapidly refilled, and he returned to the hospital, when we decided to operate by the method of Dr. Ransohoff, of Cincinnati. Making an incision through the abdominal wall, five inches in length, at the outer edge of the right rectus muscle, permitting it to gap, fastening the edges of the wound by sutures to the liver, and when firm adhesions had taken place, opening the liver by the galvanic knife. When adhesions were found to have formed, and I attempted to divide the tissues of the liver with the galvanic knife it did not act well; at first, while white-hot, it would cut readily, but the resulting very free bleeding quickly short-circuited the current and the knife became instantly cold. After repeated trials it still proved so unsatisfactory that an ordinary scalpel was substituted, with which the pus cavity was reached. An attempt to check the bleeding from the margins of the incision, by the cautery knife, was also unsuccessful, and it was only by filling the wound with a number of rubber catheters, which happened to be at hand, that the hemorrhage was controlled.

The abscess cavity was washed out daily with various antiseptics; it gradually closed, and the patient was discharged cured. When Dr. Neff saw him the following December, his weight was one hundred and fifty-six pounds, his pulse beat eighty to the minute, and he had no evidence of hepatic disease.

Epithelioma of the œsophagus. Gastrostomy; death.—John T., aged forty-two years, a patient of Dr. Joseph Lopez, of Philadelphia, was admitted to the Jefferson Medical College Hospital, December 5, 1884. He had suffered with difficulty in swallowing for one year, which had gradually increased until, at

the time of admission, he had taken no nourishment whatever into his stomach for a week and but little for the last two months. He was greatly emaciated. He could drink as much as three ounces of fluid, which would be immediately ejected with great force. A bougie could be passed readily to within four inches of the cardiac orifice of the stomach, when it was suddenly arrested.

I performed gastrostomy December 9th, assisted by Drs. S. W. Gross, Brinton, Pancoast, Hearn, and others. An incision two and a half inches long was made parallel to the margin of the ribs on the left side, and about one finger-breadth from them, beginning at the outer edge of the rectus muscle. As soon as the peritoneum was opened, the stomach appeared and its identity was verified by those present; six sutures were used to bring the viscus in contact with the abdominal opening, two at each side and one at each end. Each suture was made by placing two needles upon a fine silk thread, one of them was carried between the muscular and mucous coats of the stomach for about one-third of an inch and brought out, both needles were then carried through the abdominal walls about one-third of an inch apart. Traction upon these sutures brought the walls of the stomach in close contact with the parietal peritoneum. None was tied until all the sutures were in place. A silver wire suture was introduced through the outer coats of the stomach about the centre of the portion exposed, to serve as a guide when the stomach should be opened some days later.

The patient suffered no pain or other inconvenience from the operation, and had no evidences of peritoneal inflammation, but notwithstanding that the nourishment by rectum was continued and well retained, he lost ground so rapidly and his exhaustion was so great that we opened the stomach on the second day instead of waiting for the fourth or fifth day as is customary. Immediately on opening the stomach a rubber drainage tube was introduced and, by a funnel inserted into the tube, several ounces of warm milk were at once given, and though this was repeated every few hours he continued to sink and died two days later, or four after the operation.

Large uterine fibroid. Exploratory incision; universal adhesions preventing removal of uterus or of ovaries; recovery.—Miss Mary A., aged thirty-six years, school-teacher, was sent to me by Dr. James Graham in February, 1885. She had a large submucous fibroid causing the uterus to rise above the umbilicus. The increase in size was first noticed one year ago. She formerly had some irritability of the bladder which had now ceased. Her menstrual periods usually lasted about ten days. The ergot which Dr. Graham had prescribed for her was continued and operation not advised. The hemorrhage, however, gradually increased until by the latter part of April, when I again saw her, she had been obliged to abandon her occupation, and had been unable to leave her house for a month.

April 27, 1885, assisted by Drs. Da Costa, Edward and Percy Graham, and Dr. Koons, I made an exploratory incision in the median line, between six and seven inches in length. The bladder was found entirely above the symphysis, and in the line of the incision. By pushing it downward and increasing the incision upward, I was able to gain access to the pelvis.

The uterus was greatly and irregularly enlarged and everywhere adherent to the surrounding structures. The intestines were so firmly fastened together

that we were unable to find or remove the ovaries. The abdomen was closed with silk in the usual manner. The patient made an uninterrupted recovery. Full antiseptic precautions had been taken.

There are some points of interest connected with the subsequent history of this case. Though previous to the operation she almost invariably bled for ten days at each menstrual epoch and at least twice between the menstrual flows, immediately after the operation the excessive bleeding ceased, and for nearly two years she regularly menstruated but three or four days; she did not lose more than one-fourth of the quantity each day that she had prior to the operation and there was no bleeding whatever between the menstrual periods.

Her menstrual periods have gradually and irregularly increased until now, nearly three years after the operation, I find in my last note made this year, "No bleeding between menstrual periods, menstruation lasts from three to ten days, when the latter the bleeding is slight most of the time."

Her pains have ceased since the operation, her general health has greatly improved, and she looks much younger. Ever since the operation she has been, and is now, following her occupation as a school-teacher. Nothing was done at the operation to account for this improvement, which is great enough to have been considered quite a success, if the ovaries had been removed.

The tumor is gradually increasing in size, and is now beginning to interfere with respiration.

The next case is one of so much interest than I am anxious to have it on record, though the principal part of the operative treatment was not performed by myself. The laparotomy was performed by my colleague, when I was a member of the staff of the German Hospital, Dr. F. H. Gross, during his term of service; the herniotomy by myself during my term, though we were both present, and took active part in both operations. I am indebted to Dr. Gross for permission to report this case.

Strangulated hernia. Operation; loss of nine inches of intestine; subsequent laparotomy; several feet of bowel found obstructed by inflammatory deposits; bowel above the obstruction joined to bowel below the obstruction; recovery.—Frank F., aged eighteen years, was admitted to the German Hospital on the evening of March 8, 1884, with a strangulated right inguinal hernia of eighteen hours' duration. On opening the sac of the hernia nine inches of the bowel were found to be in a sloughing condition. The ring was nicked, the healthy ends of the bowel made to protrude, and the gangrenous portion incised. We proposed, on the next day, to freshen the edges of the healthy bowel and bring them together. By the following morning the patient had developed

an intense peritonitis with a temperature of 104°, and the operation was postponed. After a week of severe illness he recovered, the sloughing bowel having separated in the meantime.

Some weeks later, as he was slowly emaciating, and the discharges looked as though the artificial anus was high up the bowel, operative interference was decided upon. The wound was enlarged, directly upward, at first but slightly, but ultimately to the extent of several inches, for the purpose of joining the divided ends of the bowel.

In the neighborhood of the artificial anus from two to three feet of intestine were found, strongly matted together by inflammatory deposits; small projecting loops of a few inches in length were found free with both ends terminating in the mass. The lower end of the bowel, from which the slough had separated, could not readily be distinguished from any of the other loops; and it soon appeared that it would be useless to join it to the bowel which formed the artificial anus, as it was completely obstructed at many points. As the colon was free, and a few inches of the ileum, at the suggestion of Dr. Weed, then one of the resident physicians, it was decided to join the bowel forming the artificial anus to the colon. For this purpose a small opening was made in the cæcum, and one blade of Dupuytren's enterotome introduced, the other being carried into the bowel forming the artificial anus, and the two blades clamped together. A temporary ligature was placed around both intestines while the toilette of the peritoneum was made; they were then fastened in position, and the wound, about six inches in length, closed.

The patient did well after the operation, though it was found necessary to reapply the enterotome twice before a satisfactory opening was obtained, three times in all. The fecal fistula rapidly contracted, and when I last saw him he was able to wear a pad over it for a week without removal; his bowels acted naturally, he was free from pain, gaining flesh, and was working as elevator boy at the hospital.

I heard afterward that another surgeon had attempted, though unsuccessfully, to close the fistula.

Ruptured ovarian cyst. Ovariectomy; death on the fourth day.—Mrs. D., aged fifty-four years, a patient of Dr. Hogue, of Houtzdale, Clearfield Co., Pa., had suffered for some years with a large ovarian tumor, and though she had been advised by many physicians to have an operation performed, she refused until symptoms of suffocation appeared, when I was hurriedly summoned to operate.

The abdomen was enormously distended, but did not present the typical diagnostic points of an ovarian tumor.

Dr. Hogue, of Houtzdale, his brother, Dr. Hogue, of Utahville, and two of their office students were present and assisted at the operation. On incising the peritoneum, at once the contents of the ruptured cyst appeared in the wound. This material would not flow through a canula, and it was not until the incision had been increased to six inches that I was able to draw the glucose-like mass out; even then it would not run, but had to be lifted and drawn out by the hand. Of this substance there were in all about sixty pints. The abdomen was cleaned with great difficulty, the material was adherent to everything and had penetrated to all portions of the cavity. Both visceral and parietal peritoneum were thickened, roughened, and nodular. The cyst was ruptured in many places, and had probably been ruptured for a long time. It had but

few adhesions and these to the omentum, its pedicle was long, and had the operation been performed before rupture it would have been quite a favorable case. The pedicle was tied with silk, dropped, and the abdomen closed. The patient scarcely suffered from shock, though the operation was quite prolonged. After the operation she did well for two days, some of the cyst contents passing through the drain, but she perished on the fourth day, probably with septic peritonitis.

Encysted pelvic abscess. Abdominal and visceral peritoneum stitched together, abscess emptied and drained; recovery.—Morris S., aged thirty-one years, was admitted to the Jefferson Medical College Hospital June 17, 1886. He had a tumor about the size of the adult fist, deep in the right iliac fossa, just to the right of the median line. It was regular in its outline, not very painful, though tender on deep pressure, and it was covered by the intestines.

He stated that he had noticed it for two years, and that it was nearly its present size when first discovered. He had lost flesh, but was still in quite fair health. No pulsation and no murmur could be detected. His temperature, though normal in the morning, ran up to 102° each evening. It was now considered as probably an encysted purulent collection, although there were no evidences of any disease of the spine or kidneys.

With the assistance of my colleague, Dr. O. H. Allis, and the house staff, I made an incision four inches in length, beginning one inch above and one inch to the left of the anterior superior spinous process, then carried it downward and inward parallel to Poupart's ligament; about the same incision as is used for the ligation of the iliac arteries. After the muscles were divided, the transversalis fascia was separated until we were close to the growth, when fluctuation was readily detected. Carrying our incision toward the mass it was found that the parietal layer of peritoneum and that covering the abscess, though in contact, were not adherent. A series of catgut sutures and some silk ones were introduced, fastening the two layers of peritoneum together and surrounding the proposed point of incision. After verifying our diagnosis by the exploring needle, a free incision was made giving exit to about eight ounces of healthy, odorless pus. A finger introduced into the abscess cavity failed to discover the cause of the collection. A large drainage tube was introduced, by means of which the cavity was daily irrigated with antiseptic solutions, the discharge gradually ceased, and he was sent out cured July 26, 1886.

Double ovariectomy; multilocular cysts about forty pounds in weight; recovery.—Mrs. Sarah Mc. was sent to me by Dr. James Graham. She was twenty-eight years of age, married, no children, and no miscarriages. She always menstruated regularly previous to this year, during this year she had bled two or three times each month. After postponing the operation once or twice in consequence of unexpected bleeding, the third time it was performed; though she bled the night before and was bleeding during the operation. She had had no leucorrhœa, but little difficulty in micturition. No œdema in limbs or abdomen, no nausea, and no vomiting. She first noticed the tumor one year ago in the right iliac fossa, the abdominal enlargement was characteristic, the veins were enlarged, the wave was well transmitted, the uterus was small and anteverted.

Operation October 18, 1886; present Drs. J. C. Da Costa, Fisher, Graham,

Koons, and Gardner. The abdomen had been prepared the day before with turpentine and mercury, the latter being still on. A two per cent. solution of carbolic acid was used on the sponges and instruments. The incision was four inches in length, there was some ascitic fluid in the abdominal cavity, the cyst was multilocular and had no adhesions. Its contents were quite gummy, preventing the use of the canula, the pedicle was short and belonged to the left ovary, it was tied with silk, severed, and dropped.

Another cyst, springing from the right ovary and about eight inches in diameter, was found lying posterior to the first, it was also without adhesion and was removed in the same manner. The abdomen was cleansed with carbolic acid sponges and closed with silk as usual.

The stitches were removed on the fifth and sixth days, the bowels were moved by enema on the eighth day, the recovery was uninterrupted, the temperature never rising above 100° after the evening of the operation. The two cysts and their contents weighed about forty pounds.

The patient was able to walk about her room at the end of three weeks.

Large fibroma of the uterus. Removal of uterus and ovaries by abdominal section; death on the fourth day.—Mrs. S., aged thirty-two years, a patient of Drs. Skilling and MacOscar, of this city, had been ill for two years and had been bleeding for sixteen months. During the last six months she had never been free from bleeding more than a week at any one time, and for the last ten weeks, she stated, she had bled daily from two to sixteen ounces, the latter amount only after exertion, this confined her constantly to her bed or lounge. She had a good appetite, good digestion, and was well nourished though exceedingly blanched.

The diagnosis of large submucous fibroid was made when I first saw her, six months before, and full doses of ergot had been taken constantly, during all that time, without effect.

At the time of operation, the enlarged uterus reached to the umbilicus, was perfectly smooth and regular in its outline and quite movable.

On December 9, 1886, with the assistance of Drs. J. C. Da Costa, Porter, Skilling and Fisher, the operation was performed. I made a long median incision from the pubes to some inches above the umbilicus; there were no adhesions, the uterus was readily elevated and a short "Thomas" clamp placed upon its neck.

After the broad ligaments had been tied and divided, the body of the uterus was removed about an inch above the clamp.

As the abdomen was quite deep and its walls quite thick, it was utterly impossible to bring the pedicle outside, a strong silk ligature was passed through the neck, below the clamp, and tied on each side.

When the clamp was removed the parts above the ligature were found to consist of uterine wall, enclosing a section of the tumor; on removing the latter the uterine walls required but little attention to make very perfect flaps, they came together without tension and were held in position, with their peritoneal surfaces in close contact, by a continuous catgut suture. The toilette of the peritoneum was carefully made and the abdomen closed.

The uterus removed was about seven inches in diameter and contained a submucous fibroid, attached to nearly the entire inner wall; in size and attach-

ments it is nearly identical with one, also removed by abdominal section, which I presented to this Society some years ago.

The patient rallied well from the shock of the operation, and by the following day was quite cheerful, with good pulse and temperature, but she had secreted very little urine. On the third day some regurgitation of bloody fluid occurred from the stomach, the temperature increased and the urine was still scanty. There was no abdominal tenderness or distention. By evening delirium occurred and death ensued the following day. The nurse assured me that only three ounces of urine had been secreted during the four days.

On post-mortem examination there were no evidences of peritonitis except slight adhesions of the bowel lying in contact with the uterine stump. The ureters and the bladder were uninjured, no bleeding had occurred, the uterine stump had remained well closed. The uterine wound was quite clean, no decomposing or offensive fluids were present. Some small portions of the very edges of the flaps looked as though they were beginning to slough, though very much less than I feared would happen when I ligated the neck. I think, in future, I shall content myself with ligating the arteries of supply and omit the ligation of the uterine neck.

Stricture of the ileo-cæcal valve; chronic obstruction of the bowels. Laparotomy; digital dilatation of the stricture; recovery.—Mrs. Ann H., aged thirty-seven years, a patient of Dr. D. S. Jones, of Plymouth, Pennsylvania, was admitted to the Jefferson Medical College Hospital in May, 1887. She had been in good health until the birth of a child in May, 1886. Since then she had had repeated and increasing attacks of obstruction of the bowels; during which there were entire loss of appetite, obstinate constipation, constant vomiting, great abdominal pain, and tenesmus, similar, she stated, to labor pains. Lately there had appeared at these times a tumor in the lower part of the abdomen about the size of the adult fist; these attacks occurred about once a month, and as they lasted three weeks she had but a short interval of comfort between them. When free from the attack, she stated that the tumor returned to the right iliac fossa, where she thought she could distinguish it by palpation and its tenderness on pressure. I was unable, at this time, however, to recognize any unusual mass in this situation.

I kept her under observation until an attack should occur. On May 21st an attack began, and her sufferings fully verified her statements. The tumor appeared between the umbilicus and the pubes, it was about the size, and very nearly the shape, of the adult kidney.

On May 2, 1887, in the presence of Professors Gross, Parvin, Brinton, and several other physicians, I made a median incision about four inches in length and exposed the mass; it proved to be an intussusception of the ileum into the colon with a thickened and contracted ileo-cæcal valve forming the apex of the intussusceptum.

There were slight adhesions between the contiguous layers of peritoneum covering the bowel, which were readily broken up, and the intussusception reduced.

On examining the ileo-cæcal valve by a finger invaginating a fold of the colon, it was found to be hard and contracted. A longitudinal incision was made in the colon about one inch in length, and three from the valve,

through which I passed my finger and found the valve contracted to about the size of a crow's quill (one-fifth of an inch). It was slightly thickened, quite hard, white in color, and did not bleed during the examination or subsequent manipulations. It was considered by all present to be a case of cicatricial stenosis due to some previous inflammatory action, and certainly not malignant. It was dilated, with considerable difficulty, by the introduction of the little finger, the index finger was then carried through its entire length.

The wound in the bowel was closed by a continuous silk suture, including only the mucous membrane; the peritoneal mucous coats were brought in apposition by a continuous silk Lembert suture.

All the operative procedures upon the bowel were performed outside of the abdominal cavity, the abdominal wound being kept closed by sponges. The portion of bowel outside was thoroughly washed and returned, the abdominal wound was closed in the usual manner.

There was some vomiting after the operation, the patient was kept slightly under the influence of morphine for a few days, and on a milk and broth diet. The bowels opened naturally on the eighth day, the stitches were removed on the fifth and sixth days; the temperature never rose above 100°. She returned to her home entirely free from all her previous symptoms, and remained free for several months.

[Her subsequent history appears later in this paper.]

Obstruction of the pylorus. Digital dilatation by Loreta's method; death from exhaustion.—George H., German, aged fifty-eight years; blacksmith. His health had always been good until the last year. At the time he came under my care he had the typical symptoms of complete pyloric obstruction, with a well-marked tumor at the usual situation, it was not very large nor hard, had no marked outlines, and presented the characters of pyloric thickening more than those of a malignant growth. The microscopical examination of the matters vomited gave no evidence of malignancy, and no vomiting of blood had occurred. He was greatly emaciated, and so feeble that at first I refused any operative interference; the operation had, however, been explained to him, and its performance promised before he came under my care, and he insisted so strongly on having a chance for prolonging his life that I consented.

The operation was performed at Jefferson Medical College Hospital May 22, 1887, in the presence and with the assistance of Professor Brinton, Dr. Wirgman, and quite a number of others.

As the patient's condition warranted no further interference than mere dilatation of the pyloric orifices, and as the usual incision to the right of the median line would have exposed the stomach nearer to the pyloric orifice (as shown by the position of the tumor) than I desired, I made the incision directly in the median line, and about three inches in length, beginning an inch and a half below the ensiform cartilage.

The stomach was readily exposed three inches from the pylorus. The examination of its exterior threw no new light on the character of the growth, though the stomach at this point was found to be slightly adherent to the structures beneath. An incision, a little over one inch in length and three inches from the pyloric orifice, was made in the stomach, parallel to and directly beneath the abdominal incision, the coats of the stomach were much

thickened. Complete stenosis of the pyloric orifice was found when the finger was introduced, this was readily dilated with the little finger, while the tumor was supported outside the abdominal walls with the left hand, the orifice was then further dilated by the index finger.

The thickening and infiltration of the walls of the stomach at the point of incision prevented the use of the Lembert suture, their softened condition evidently required the suture to pass through all the coats. As the abdominal wound was directly over that in the stomach, the latter was closed and brought in contact with the abdominal wound, so that the visceral and parietal peritoneum might adhere, and if any of the contents of the stomach should escape or any pus form, they might readily drain outside and not into the general peritoneal cavity. Fine silk with two needles were used, these were carried from within outward through all the coats of the stomach, one needle through each lip, then crossed and one brought through each lip of the abdominal wound, a few were carried direct without crossing. These sutures were brought together but lightly and the abdomen closed.

Nothing was given for the first twenty-four hours by the stomach, the rectal nourishment upon which he had relied previous to the operation being continued. No vomiting occurred during the four days that he lived, on the second day milk and hot water were given in small doses at regular intervals, and as they were well borne they were increased in quantity and frequency. Notwithstanding the fact that he took over a quart of milk per day, besides rectal nourishment, he sank and died exhausted on the fourth day after the operation. There had been no elevation of temperature.

At the autopsy the stomach was found firmly fastened to the abdominal wall, there was no evidence of any peritonitis. In the interior of the stomach it was difficult to find the point at which the incision had been made, the sutures being completely buried in the folds of the mucous membrane. The pyloric thickening was inflammatory in character, and not due to any malignant growth.

There was complete obstruction previous to the operation, there was none after, and had the patient been subjected to operative interference earlier there is no reason why his life might not have been greatly prolonged.

Ovarian tumor. Removal; recovery.—Miss A., aged thirty-eight years, had noticed a painless abdominal enlargement for a few months. On examination I found a small ovarian cyst, lying in the median line and rising slightly above the umbilicus. On May 23, 1887, with the assistance of Drs. Da Costa, Edward Graham, Sweet, and Fisher it was removed. The incision was about three inches in length, the tumor was non-adherent. It was tapped, drained, and removed in the usual manner; its pedicle was tied with silk and dropped.

The peritoneum was brought together with chromicized catgut, the interrupted silk suture being used for the other tissues. The patient made an uninterrupted recovery, her temperature never rising above 99°. The tumor weighed about fifteen pounds.

Two penetrating stab wounds, one puncturing the liver and one the transverse colon. Laparotomy; recovery.—Michael H., aged twenty-five years, was admitted to the Jefferson Medical College Hospital at 3 P. M., of September 9, 1887. About three hours previously he had been stabbed twice with a small and pointed amputating knife, during a quarrel in a house of ill-fame.

There were two wounds, both penetrating the abdominal cavity, both at the outer edge of the right rectus muscle and both running diagonally toward the median line, and penetrating the peritoneum at that point. The upper was one and a quarter inches long and was just below the edge of the ribs, it terminated in the left lobe of the liver, from it there was free venous bleeding.

The lower wound was three-quarters of an inch long; it was three inches below the upper and just above the level of the umbilicus. After hurried antiseptic preparations, I opened the abdomen in the median line from the ensiform cartilage to the umbilicus, and found an opening about five-eighths of an inch in length in the transverse colon parallel to its length and near its mesenteric attachment; this was closed by the continuous silk Lembert suture. The suture failed to control a small artery in this wound, but a separate stitch carried under it and tied secured it.

The wound in the liver was small, it had ceased oozing, and as its lips were in fair contact no suture was used. The abdomen was cleansed, the wound closed and dressed in the usual manner.

The following morning his temperature was 101° and in the evening 100°; after that, though it kept quite low, varying from 98½° to 99½°, he had a sharp attack of peritonitis, lasting three days, during which time there was constant regurgitation of bloody fluid. The abdomen was painful and greatly distended with gas, requiring the constant use of the long rectal tube to relieve him. The stitches were removed on the fourth and fifth days, and the abdomen supported by adhesive plaster. He was discharged cured on September 29th, having been in the hospital twenty days.

Epithelioma of the ileo-cæcal valve. Resection of three inches of intestine; recovery.—Mrs. H., aged thirty-eight years, the same patient whose ileo-cæcal valve was dilated seven months before (see page 109). came complaining of a return of her former symptoms, her sufferings were slight, but were evidently of the same character as before the first operation.

November 1, 1887, with the assistance of Drs. Allis, Kendig, Stillwell, and the resident staff, I again opened the abdomen. A straight incision parallel to the median line was made, it was three inches in length terminating at a point one inch outside the middle of Poupart's ligament. The incision was made at this point as the nearest to the portion of bowel I wished to attack, because I feared adhesions might have formed after the last operation, rendering it inaccessible from any distant incision; and, further, if it became necessary to form an artificial anus, it would be a convenient point.

I had decided that if it should prove to be a recontraction of the stricture, to make a longitudinal incision about two inches in length carried through ileum, ileo-cæcal valve, and cæcum, bringing the two ends of the wound together and sewing it up transversely; this would best be made on what would be the under surface of the bowel when the patient stands erect. I tried this on the cadaver and found it practicable, and that it increased the circumference of the bowel, at that point, about two inches.

The head of the colon was readily found, there was no return of the intussusception, no adhesions had formed, though in reducing the intestine at the first operation there had been slight bleeding at a number of points where adhesions were torn. The scar of the original intestinal incision was scarcely

perceptible. At the ileo-cæcal valve, however, there was now a decided tumor, and it was evidently epitheliomatous.

An incision was carried into the mass verifying the diagnosis; the entire valve had become an irregular mass of epitheliomatous tissue varying in thickness from half an inch to an inch, entirely obstructing the gut except an aperture in the centre, about one-third of an inch in diameter. The circumference of the valve was less thickened by the disease than the centre.

The abdominal wound was now closed by sponges, leaving the diseased parts outside; three inches of the bowel, including the disease, were removed; no clamps were used, the bowels being held in the hands of an assistant; a few vessels were tied.

As the mortality is very high when the separated ends of the bowel, in these operations, are sewed together and returned, I had decided if it became necessary to excise, to establish a temporary artificial anus and begin at once the proceedings for its cure. With this end in view, immediately after the removal of the diseased bowel and the ligation of the bleeding vessels, one blade of Dupuytren's enterotome was introduced into each portion of bowel, viz., one into the ileum and one into the colon, the two blades were brought together and the screw run down firmly. A strong ligature was placed on the ends of the bowel, including the enterotome, to prevent the escape of feces during the subsequent manipulations. The bowel was washed, placed in position at the lower angle of the wound and fastened there with a continuous silk suture. The abdominal wound was closed, covered with cheese cloth saturated with mercurial solution, and this in turn with patent lint soaked in sweet oil. This is the best method that I have found to protect abdominal wounds close to an artificial anus. The heavy ligature around the ends of the bowel was now removed, a ring of cotton soaked in oil placed around the artificial anus, the outer extremity of the enterotome supported by oakum, and a wide bandage pinned over it.

Morphine was used hypodermically during the first forty-eight hours and then discontinued; vomiting occurred during the first two days and then ceased. Some feces appeared on the evening of the operation, and full quantities two days later.

On the eighth day the enterotome was found loose, and was removed; its removal was preceded by a passage of feces from the natural outlet. The stitches were removed on the third and fourth days, and the wound supported by adhesive plaster. After the removal of the clamp the patient was permitted to rise, and all restrictions removed from her diet.

The bowels acted naturally for a few times, when all the feces came again from the artificial anus. The clamp was again applied on the 17th, and came away on the 28th. Its removal was again followed by a few natural passages. As these ceased in a few days, the clamp was applied for the third time with a precisely similar result.

As this had proved ineffectual, the method of Mr. Banks, of Liverpool, was used. A strong ligature was fastened to the middle of a heavy piece of rubber gas tubing about six inches in length, one end of the tube was passed into one bowel, the other end of the tube into the other bowel, the middle of the tube pressing against the spur. The position of the bowel in this case was such that the rubber tube was retained with difficulty. After trying it

for ten days without success, I substituted the apparatus which I here show, consisting of two pieces of very heavy rubber gas tubing joined together like the letter T. The upper part of the T is about one and a half inches long, and presses directly against the spur; the other tube is three inches long, and merely serves to keep the first in position. The large base is circular, is three inches in diameter, and serves as a pad to prevent the escape of feces from the artificial anus. The three pieces of rubber are joined firmly by a strong wire running from the first to the last piece, and twisted tight. This method proved at once satisfactory, and a large proportion of the feces began at once to pass by the natural outlet, and continued to do so. The patient is now in the hospital, but I shall make no attempt to close the fistule until it is seen if the bowels will continue to act naturally.

During this prolonged treatment, fearing that the colon, from disuse, might contract, I directed that she should be given an injection of a quart of water daily, and I was surprised to hear that when a pint had been given it appeared at the artificial anus. By continuing these injections the capacity of the colon was rapidly increased, and when last tried it held three pints; of course, when the bowels began to act naturally this was discontinued.

Chronic obstruction of bowels by encephaloid tumor. Exploratory laparotomy; artificial anus established; recovery from the operation; death fourteen days later from obstructive peritonitis arising from tumor.—Francis O. B., aged thirty-eight years, Irish, carpet porter, a patient of Dr. James Robinson, with whom I saw him January 18, 1888. He was in perfect health until June, 1887, when he began to have slight cramps, once or twice daily, and occasionally at night, in the left iliac fossa. He continued working until December 24, 1887, and has been confined to bed since. His attacks had not increased greatly in severity, but he was getting much weaker. He had lost fifty pounds in weight; he vomited once or twice a week; it was not stercoraceous. He suffered greatly with tenesmus, which produced from ten to fifteen passages during the night, each being a small, hard, white mass about the size of a cherry.

The left iliac fossa was slightly tender. The abdomen was distended with gas. The pulse was 104, and the temperature normal. His pain was uninfluenced by food. He had never passed blood by the bowel. The rectum was found empty and unobstructed.

Later I removed him to the Jefferson Medical College Hospital, by which time his pain was nearly constant, and he was unable to sleep without large doses of morphine. Some days after admission his temperature increased to 103°; there was increased abdominal tenderness and other evidences of a slight attack of peritonitis, which disappeared in forty-eight hours. On the 28th he passed wind by the penis, and again on the 30th.

On January 30, 1888, with the assistance of Drs. Allis, Nancrede, Robinson, and the house staff, I opened the abdomen. A median incision about four inches in length was made, and a lobulated tumor the size of an orange was found in the angle between the bladder and the spine. The sigmoid flexure of the colon was tightly adherent to and partly buried in the tumor. The cæcum was carried toward the median line, and was also adherent to the tumor. The lower end of the ileum was closely adherent, and its calibre nearly obliterated.

The colon was contracted and collapsed; all the bowels above the point of obstruction in the ileum were greatly distended.

As nothing could be done with the growth, a fold of the ileum a few inches above the point of obstruction was brought out of the wound and fastened in its lower angle by a few silk sutures, a rubber drain was introduced, as a glass one failed to reach the desired point, and the abdomen closed. The drain was removed about twelve hours later, as I feared to have it remain in such close proximity to the artificial anus. Twenty-four hours after the operation the fold of bowel in the wound was opened, and the artificial anus established.

On the second day the patient was placed upon his usual food, stimulants, etc. The stitches were removed on the fourth and fifth days; the wound healed promptly. It was successfully kept from contamination by the fecal discharges, by the method described in a case reported above.

At the operation a fold of bowel was brought entirely out of the wound; this was adopted as a modification of the method of entirely cutting off the bowel, closing the lower end with sutures, and using the upper to form the artificial anus.

The method here adopted has the advantage of rapidity, less danger of contaminating the cavity with fecal matter, as the opening of the bowel may be postponed until firm adhesions have formed. It permits any gases or other material that may be imprisoned in the lower bowel to escape, and quite as effectually prevents any material passing the artificial anus into the lower bowel.

The patient was relieved of his pain, the vomiting ceased, and he slept well; had a fair appetite, and improved in appearance. All fecal discharges, and they were very copious, came from the artificial anus, and none by the natural outlet after the first twenty-four hours.

On the thirteenth day there was a slight elevation of temperature, and all fecal discharges suddenly ceased, injections of warm water carried some distance above the opening by a soft catheter were without effect; by evening vomiting and other symptoms of acute obstruction occurred, and he died twenty-four hours later, or fourteen days after the operation.

The post-mortem examination was made on the same day. The abdominal wound was solidly healed; the bowel, at the artificial anus, was firmly attached to the abdominal opening. The abdominal cavity contained quite a quantity of opaque serum; the opacity was greatest near the tumor, and on pressing the tumor, thick, purulent-looking fluid exuded from it. This was probably the origin of the fatal peritonitis. The bowels were but slightly congested, and at one point only, about twelve inches above the artificial anus, were adherent. The bowel at this point was sharply flexed upon itself, and adherent for about three inches, causing complete obstruction. This adhesion was readily broken down by the finger, and it would probably have yielded to an active saline.

The condition of the bowels, as found at the time of the operation, was verified, the tumor was broken down, and had ulcerated into the sigmoid flexure; a large number of secondary nodules were scattered through the liver. The microscopical examination was made by Dr. Longstreth; the tumor and the nodules from the liver were reported by him to be encephaloid.

A REPORT OF THREE CASES OF OPERATION FOR STRANGULATED HERNIA.

BY JOSEPH PRICE, M.D.

[Read April 11, 1888.]

CASE I.—Miss B., white, aged forty, single, a patient of Dr. Dundore, had had a reducible inguinal hernia of long standing and had never worn a truss. In May, 1887, it became irreducible, and the bowels were completely occluded for three days. Well-directed efforts to reduce failing, Dr. Dundore decided upon operative interference, and invited me to see her. The usual symptoms of a strangulated hernia were present, the abdomen being greatly distended and tympanitic.

Upon incision the bowel was found to be firmly adherent to the sac, requiring considerable dissection to free it completely. After severing the stricture, the bowel was pulled out for a few inches, and found to be completely occluded by bands of inflammatory tissue due to limited peritonitis at the point of stricture—the neck of the sac. These bands were broken up by fingers, forceps, and scissors, which restored the calibre of the bowel and it immediately collapsed. The bowel was very dark in color until released from these inflammatory bands, when its color changed rapidly, and I decided the circulation sufficiently good to restore it to the abdomen. The canal was closed by buried silk-worm gut sutures; the incision with silk. Dry dressing; recovery.

CASE II.—Miss K., white, aged seventy-five years, never pregnant, a patient of Dr. F. X. Dercum, who called me in consultation March 1, 1888. Found the patient in bed and very feeble, with a history of complete occlusion of the bowel for twelve days, and stercoraceous vomiting for eight days. The abdomen was much distended and tympanitic. There was a tumor the size of a hen's egg over the right femoral ring which presented no fluctuation nor other symptoms of local trouble. There was also a tumor over the left femoral ring the size of a goose egg, likewise presenting no symptoms of local trouble. The patient said the tumor on the left side had existed for eighteen years, while that on the right side was more recent, but also of several years standing. Taxis failing to accomplish any results, operation was suggested as the last resort, and was performed the next day at the patient's request. As there were no symptoms specializing either ring as the site of the obstruction, and as the distention was so great that occlusion at some other point was feared, the incision was made in the median line. Examination now revealed that the tumor on the left side was not a hernia, but either a hydrocele of

the canal of Nuck, or an old hernial sac that had become cystic. The gut was incarcerated at the right femoral ring, and very firmly adherent. Fearful of tearing the intestine I made another incision over the tumor, and was compelled to dissect the intestine from its sac. The intestine was then drawn through the median incision and carefully examined. It was found to be greatly congested, but speedily cleared, and was returned to the abdomen. The neck of the sac was twisted upon itself, and transfixed by deep buried sutures of silk, and stitched to the edges of the ring, the canal being closed by deep silk sutures. The median incision was closed with silk sutures. Dry dressings. The bowels moved spontaneously the same evening, and the patient recovered without a bad symptom. Stitches were removed on the tenth day.

CASE III. *Operation for ventral hernia.*—(By Dr. Joseph Hoffman.) Mrs. M., aged fifty-eight, married at nineteen years, ten children, four miscarriages. She first noticed the rupture about fourteen years ago, when it was the size of a thimble. She in no way attributes the origin of the rupture to child-bearing, which, since she is a large, heavy woman weighing about one hundred and ninety pounds, and having a great pendulous belly, would at first suggest the probable cause. The cause to which she attributes the hernia is a rather singular accident. Being, as has just before been stated, a large woman and her belly pendulous, when lying on her side, the abdominal walls lax and flaccid lie loosely on the bed. One night while in this position, at the side of her husband, he turned in his sleep, and in so doing put his elbow directly upon her belly, forcing, as seems probable from her story, the two recti muscles apart. At any rate from this time on she suffered discomfort, a burning sensation, and finally the hernia appeared. Her husband being a cripple and a fruit dealer, she was accustomed to help him by carrying his baskets from the markets, by this means her trouble grew worse. Two or three years after its first appearance she was suddenly taken ill, her bowels refusing to move. Finally, after taking forty cents worth of castor oil, a movement was secured with great suffering. After this she had a second violent attack in about a year, and from this time on she has had attacks at intervals of about four months, till the time at which Dr. Price and myself operated on her, the last of August. During this period she was seen by six or eight physicians, most all of whom described her trouble as a "twisting of the guts," but operation was never suggested. Cathartics were administered to her each time she was attacked, no physician seeming to recognize the fact of their danger, one excepted, who also finally ordered them. At her first attack, it has been omitted to state, she was given up to die. In all she had ten or twelve serious attacks. At her last seizure, in August, 1887, after efforts to secure two other physicians she came for me. I found the woman in extreme pain, she had not vomited. Examination was made and the hernia discovered above the umbilicus, about the size of a pint tin-cup or larger, very tympanitic and hard. Application of hot poultices was ordered, and a hypodermic of one-half a grain of morphia given. The next morning she was much relieved, the tumor smaller, and altogether she was very comfortable, so much so, indeed, that I omitted my visit the day after. The next, the fourth day, I again visited her, and to my dismay found her vomiting stercora. This was all the more astonishing because I had not been in-

formed of any change for the worse. I at once administered a second hypodermic of morphia, and went for the assistance of Dr. Joseph Price. After some delay I found him, and we operated at once. An incision was made about six inches long over the hernia. The integument was very thin, and extreme care was necessary to avoid cutting through the intestine. On getting through into the peritoneum, we found it so much thickened that it was at first impossible to distinguish between it and the gut. It was finally differentiated and carefully dissected free from the gut, to which it was closely adherent. The guts, too, in the sac were closely adherent, and separated with difficulty. The sac was tied off and removed. The distention of the bowel disappeared at once on its being freed. The strangulating portion of the sac was so firm as to resist all efforts to stretch it, and only by the utmost care was the bowel released, grasped as it was as if in a vise. About ten inches of the large intestine were found in the sac. This portion was very dark, but not gangrenous. After its release, the gut was carefully washed and returned. The incision was closed by deep and superficial sutures, all of silk. The catgut we happened to have was too slight to withstand the great strain put upon it by the enormous belly walls. Indeed, the silk was little better, for having been so long in antiseptic solution it had become rotten, and was thoroughly untrustworthy. I was unfortunate, too, in the breaking of the curved needles, which having been made for the Hagedorn holder were not fitted for an ordinary instrument. The operation was however completed. The woman made a rapid recovery, and in three weeks was up, and stated herself more comfortable than she had been for fourteen years.

The incision did not suppurate worth the name, and closed promptly, though not smoothly.

Examination to-day finds the patient entirely comfortable, though the recti have again separated. She wears both a band of rubber adhesive plaster, and a muslin bandage. Is entirely well. Her belly bandaged is fifty and one-half inches in circumference.

A CASE OF HYSTERECTOMY.

By W. W. KEEN, M.D.,

PROFESSOR OF SURGERY IN THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA, SURGEON TO ST. MARY'S,
ST. AGNES', AND THE WOMAN'S HOSPITALS, ETC

[Read April 11, 1888.]

THE following notes of this case I owe to the courtesy of Dr. John K. Mitchell, her attending physician :

"Miss X., aged forty-two, American, author. Family history good. Previous personal history good up to about twelve years ago, when she began to suffer in many ways, pointing toward a uterine growth. After two years or more of treatment, Dr. S. Weir Mitchell recommended that the ovaries should be removed. This was done *per vaginam* by Dr. Wm. Goodell in the winter of 1876-77. The tumor diminished, but she has never been free from pain since, chiefly in the left hypochondrium, but extending both up and down. For between two and three years before I first saw her (January 25, 1887) her general health had been steadily growing worse, and the distress in the side increasing to such a degree that she was utterly unable to work, and was wretched alike in body and mind.

"*Status præsens*, January 25, 1887: Slight woman, anæmic, not emaciated, complexion pasty. Heart and lungs normal. On examining the abdomen externally a very slight abnormal increase in the uterus upward and to the left was detected. I supposed it the remnant of the old growth, but the patient did not desire a vaginal exploration made and I was unable to examine it further. There was here no pain or tenderness. An inch below the lowest angle of the ribs on the left side was situated a spot not larger than a quarter of a dollar, tender on pressure, and nearly corresponding in situation with a similar but less defined area of tenderness posteriorly. Most of the distress complained of was vaguely placed hereabouts.

"The kidneys could be clearly outlined by percussion, and showed no change from the normal in their areas. The urine was natural, but sometimes contained a slight excess of uric acid formations; bowels always slightly sluggish and the appetite poor; no digestive trouble; she slept very ill, being unable to lie on the back or on the left side, as either position increased the pain in the side, and finally caused a suffocating sensation. It is also greatly aggravated by very slight physical exertion, by sitting long in one position, and by constipation. It is now so constant and severe that Miss X. complains of 'losing her grip,' of inability to work to good purpose, and of great irritability.

"*Treatment.*—In spite of the previous ovarian and uterine trouble, the situation of the pain seemed to me to be so far from the former site of the ovaries that I was doubtful of their having any share in the present difficulty, though the thought of a nerve caught in the stump left after their removal occurred to me. My treatment was at first directed to the slight lithæmia. Alkaline waters and a regulated diet did little good, and I returned to the view of the implication of a nerve in the cicatrix, and for some weeks passed a galvanic current through the body, with one pole on the posterior tender spot and the other over the one in front. Miss X. was for two or three months much relieved by this, and grew better when a tonic mixture of iron, quinine, and strychnia was given. The treatment was interrupted for a short time by a slight attack of acute articular rheumatism in the left foot and ankle. This yielded readily to salicylates, but returned in a less degree once or twice afterward. For a time cannabis indica tincture at night helped her to sleep, but did no permanent good.

"Throughout a summer in the country her condition varied, but in October she was decidedly worse—more pain, more mental and physical disability, and, finally, repeated violent neuralgic headaches. The fact that there might be a pressure on a nerve, and possibly on the bowel, from the cicatrix of the old wound again occurred to me. There was possibly, also, nephritic trouble suspected. In order to determine the facts, a careful examination under ether was advised."

Early in October, 1887, with the assistance of Dr. J. K. Mitchell, I etherized and examined Miss X. with great care. I found the uterus small, the internal measurements two and one-quarter inches; normal position; freely movable; the posterior wall somewhat thickened. On each side of the uterus a distinct tumor was found about the size of an English walnut. That upon the left side was movable independently of the uterus, and was thought to be the knobbed end of the stump resulting from the previous operation by Dr. Goodell. That upon the right side moved strictly with the uterus and was thought to be a uterine myoma. No other lesion was found in the pelvis. There was nothing detectable in the abdomen in connection with the left kidney, in front of and behind which the chief pain was complained of.

In view of the extremely wretched condition of the patient an exploratory operation was advised.

Operation November 9, 1887. Drs. J. K. Mitchell and W. J. Taylor assisting. An incision was made in the middle line, five inches in length, from the pubes upward. As soon as the peritoneal cavity was opened the uterus came into view and the two tumors above described were immediately recognized. They were so intimately incorporated with the body of the uterus that it seemed hopeless to attempt to remove them separately. In view, also, of the other additional myomata now discovered, and described later with the specimen, it seemed to be the more unwise to leave the uterus in place; accordingly, a Kœberle serre-nœud was applied to the cervix, and the body of the uterus, with its attached tumors, after separation from the peritoneum, was removed by the scissors, the lateral attachments having been first ligated. The peritoneum was now stitched over the stump. Before removing the uterus a careful search had been made in the left hypochondrium, but nothing abnormal was found. The abdominal wound was now closed, first, by a continuous

suture to the peritoneum, and next, by a row of stitches passing through the rest of the abdominal wall. The clamp was separated from the skin by small pads of sublimate dressing on each side, and a large sublimate dressing and a flannel binder were applied.

Dr. George Dock kindly examined the specimen, and reported as follows :

"The specimen consists of the body of the uterus with 3.5 cm. of the right Fallopian tube and corresponding parts of the round and the broad ligaments, and 1 cm. of the left Fallopian tube, the round and the broad ligaments on that side being cut off close to the uterus and the tumors described below. The remains of the ovarian ligaments cannot be made out.

"The fundus is of average size (nullipara) and appears to be cut off just below the internal os. The anterior surface is of normal curve. About the middle of the right border is a subserous fibromyoma, the size of a small bean. The posterior surface bulges excessively, the projection being due to the presence of a mural fibroid tumor which makes up most of the bulk of that part of the organ. The cavity of the uterus (fundus) is flat from before backward, and is triangular in outline, the opening of the tubes being in the two upper angles, the os internum in the lower. The sides of the angles measure: Right, 27 mm.; left, 22 mm.; upper, 25 mm. The right upper angle is at a higher level than the left, the wall of the uterus being relatively thinner on that side. The surface of the cavity is smooth, and presents three small polypoid growths, two on the anterior, one on the posterior surface. The anterior wall is 8 mm. in thickness, the posterior 2 cm.

"The tubes show nothing abnormal. To the right of the fundus in front of its transverse axis and 1 cm. below the level of the insertion of the round ligament, is a tumor the size of a walnut (36 x 26 x 26 mm.). It lies in the angle formed by the broad ligament and the uterus, close to the latter, being separated by loose connective tissue and bloodvessels. It is covered by peritoneum, the greater part of which is that forming the anterior fold of the broad ligament.

"The surface of this tumor is irregular. On section it is hard, creaks under the knife, the cut surface is dark gray in color. Around the periphery are whitish fibrous masses and extreme calcification.

"Microscopic examination of this growth shows it to be a myoma which has undergone partial necrosis, with pigmentation and calcification.

"To the left of the fundus, behind the transverse axis, is another tumor, slightly smaller than the one just described (33 x 26 x 28 mm.). Its upper surface is on a level with the fundus. Its nodular surface is covered with peritoneum, and it is separated from the uterus at a distance of 5 mm. by loose connective tissue in which lie two smaller tumors. On section it shows a lobular structure of firm white tissue (fibromyoma). In the upper part are masses of hard, calcareous matter (calcium carbonate). The two smaller tumors in the connective tissue are myomata."

For the next three days the patient complained greatly of pain, which was relieved by considerable doses of morphia. It should, however, here be stated that she bore pain badly. Her highest temperature was 99.7° F., and

the normal was reached at the end of the third day. At this time, of her own accord, she declined any further morphia. The catheter had to be used for the first three days. With the exception of a rather obstinate constipation, which caused considerable abdominal pain and sleeplessness, which last was relieved by *cannabis indica*, her later history was uneventful, saving in one particular. The wire was tightened to the utmost limit in the course of the week after the operation, but the stump did not slough nor did the clamp become loose. As the clamp was producing ulceration of the skin, it was removed December 2d. The wound, at this time, was reduced to a tubular sinus leading down to the stump. The last slough from the stump did not come away until December 26th, and the wound was completely healed January 6, 1888.

Since that date the patient has been absolutely well, physically and mentally. She eats and sleeps well, and takes active exercise with more satisfaction than at any time during the last twelve years; in fact, she is thoroughly restored to good health.

To complete her history, I will add the examination of her eyes by Dr. De Schweinitz, "oval disks; rather too gray; retinal haze, both venous and arterial; lymph sheaths distended. This low grade of retinal disturbance is, I think, purely accommodative. There is a high degree of insufficiency of the internal recti." He prescribed the proper glasses.

REMARKS.—The removal of the ovaries by Dr. Goodell, which was done *per vaginam*, was one of the earliest of such operations done in this country. It reflects no little credit upon his skill, that in so contracted a vagina he was able so successfully to remove the ovaries. Although this operation relieved her temporarily from pain, it proved of no permanent benefit. Her pains returned, and though located differently, grew worse and worse, so that, finally, all mental exertion and all physical exertion as well, became greatly hampered. In fact, writing, which was her vocation, became impossible. She was willing to undergo any operation whatsoever which held out any chance of relief. She preferred to die rather than to live in such wretchedness.

The diagnosis was very obscure. What the meaning of the pain in the hypochondrium was, I could only surmise. The two tumors on each side of the uterus were believed to be, one a uterine myoma, and the other, an enlargement on the stump following Dr. Goodell's operation.

An examination of the specimen shows, as to the first, that I was right. But no enlargement had taken place on the pedicle on the left side; the tumor being one of a number of myomata developed in connection with the uterus. Its situation at the cornu uteri very naturally misled me.

No other operation than hysterectomy would, I think, have been

advisable. Its performance was easy; and its results have been perfect.

Why the removal of the uterus, with its attached myomata, should get rid of pain in the hypochondrium I am unable to say. To say that it was reflex pain is simply to express our ignorance in different words. Certain it is, however, that the removal of the entire internal organs of generation has been followed with the happiest results, whereas, the removal of the ovaries alone gave but little relief.

I have deemed it important to report the case in consequence of the recent question as to the results of complete and incomplete removal of the tubes with the possibility of the development of tumors on the stumps after incomplete removal of the tubes. My first impression upon examining the specimen itself, was that the two tumors were such knobby stumps, but after section and microscopic examination by Dr. Dock, this impression was seen to be erroneous.

DISCUSSION.

DR. JOHN H. PACKARD: The amount of material presented for discussion in the papers read is so large that it would be difficult to do it justice.

In connection with the cases of hernia reported, he briefly mentioned another, in which an old femoral hernia was subjected to unjust suspicion. The patient, a woman, about fifty years of age, was brought to St. Joseph's Hospital with intestinal obstruction of four days' standing; her general condition was bad, and she had fecal vomiting. She had an old left femoral hernia, which had given trouble on several occasions, but had always been successfully reduced. This was cut down upon, and the sac found to be empty. Laparotomy was at once performed, a twist of the small intestine being found and relieved, flatus was discharged per anum, and the intense congestion and distention of the bowel relieved so that the mass was easily returned. In spite of vigorous stimulation hypodermatically and by the mouth, the patient sank, and died in about six hours. In this case, which will be elsewhere reported more in detail, an earlier operation would probably have had a different result.

As illustrating the difficulties attending the diagnosis of abdominal tumors, a case may be mentioned which occurred at the Episcopal Hospital some years ago. A man was sent down from the medical to the surgical ward to be operated on for an apparently movable tumor situated on the left side of the belly two inches below the level of the umbilicus. It was found, however, that the mass was firmly adherent to the parietes, and the operation was abandoned. The man died a few months later, and an autopsy showed that the disease was epithelioma of the pylorus, which had in some way become displaced and fastened by peritoneal adhesions in its abnormal relation.

The seat of pain is very deceptive as an index of the actual lesions in these cases. A woman who was brought to the Pennsylvania Hospital in 1886 on account of a gunshot wound, complained of pain in the right iliac region only, yet the ball had ranged upward from the left loin to near the right axilla, wounding the pleura, colon, stomach, liver, right internal mammary artery, and right breast.

DR. WM. GOODELL: Some two years ago I operated, performing a double ovariectomy. The cysts were colloid, and there was no indication of malignancy. About a year afterward, the patient then being apparently well, she fell in getting out of a carriage. There was pain in her right side, considered by her attending physician in the country to be an attack of peritonitis. The pain afterward shifted to the left hip, growing worse and worse. She was brought to me again and I examined her with the utmost care, feeling sure, from the symptoms and from the emaciation that had occurred, that there was malignant disease. I thought that perhaps the stump of the ovary had taken on malignant degeneration.

Finding nothing, I called in a distinguished specialist, who twice examined her under ether, but failed also to detect a cause for the pain. The actual cautery was applied along the course of the sciatic nerve, to which region the pain was referred. Death took place in a few weeks, and at the autopsy, which was requested by the lady before her death, disseminated metastatic cancer of the liver was found. Clearly the ovarian disease had been malignant in the beginning, and was the focus from which sprang the hepatic disease. But the salient point here is pain apparently in the sciatic nerve, while the site of disease was the liver.

A few words as to Dr. Barton's case of ruptured cyst. The patient died probably from acute septicæmia. I have seen so many cases of burst cyst recover, that I have ceased to regard the accident as dangerous unless the general health has deteriorated from chronic absorption of septic material. Of course, this may occur. My last case failed to rally, and died on the seventh day from sheer exhaustion. The rupture had occurred some weeks before from a fall, and the vital powers were slowly impaired, as if by chronic poisoning. Here every abdominal organ was infected and she was greatly emaciated, and also bedridden.

On the other hand, I was surprised to-day by a visit from a patient upon whom I operated not quite two years ago. She had been tapped by a prominent physician in New York, who was unable to remove the fluid because it was colloid. A few weeks later I saw her. She was then very weak and emaciated and confined to her room. At the operation it was discovered that the cyst had ruptured and that every organ was either affected or infected with colloid. Even the skin and the abdominal wall were infiltrated with it where the trocar had entered. I thought she would recover from the operation, but expected death in a few weeks from progressive colloid infection. She was in blooming health when she called on me to-day, and had gained forty pounds.

With regard to the prognosis in these cases of burst colloid cysts, I hardly know what to say. I have seen cases remain well as long as three and four years and then the disease returned in some other organ. On the other hand, I have had a fatal return in a few months' time. When we open an abdomen

and find the whole peritoneum roughened with miliary prominences or with papillary excrescences, are we dealing with a benign or with a malignant disease? This is the important question, for on it hinges the prognosis; yet I am unable to answer it.

The apparent improvement after exploratory laparotomy referred to this evening, especially in bleeding fibroids, I have met with in several cases, and it is mentioned by others. I cannot explain it. Possibly the irritation from the operation causes uterine contraction, or sets up some change in the circulation.

I think that Dr. Barton removes his stitches too soon. I used to remove them in five or six days. But some years ago a wound, after ovariectomy, reopened and there was considerable oozing of serum. The patient recovered, however. I then allowed the stitches to remain seven full days. In a case of laparotomy in which I had removed the stitches on the eighth day, the patient, who was doing well, got some hot tea into her windpipe on the tenth day, and in the paroxysm of coughing the wound reopened. I had much difficulty in returning the distended bowels, and she died in two or three days apparently from shock and not from inflammation. Two or three months ago I opened an abdomen to remove the ovaries for a fibroid, under a distinct promise not to touch the tumor. I could not get at the ovaries they were so imbedded in the tumor, and I accordingly closed the wound. On the ninth day the stitches were removed. A few days later, through some imprudence of the patient, the wound burst open to the whole of its length. My son closed it, and the woman barely escaped with her life. In such cases I shall in future leave the stitches in for at least two weeks.

A word as to the use of ether: I had nineteen cases of oöphorectomy last year, with one death. In that case the operation was very easy, yet suppression of urine followed and the patient died from uræmia, which I attributed to the ether. As symptoms of kidney disease were not manifest before the operation, I omitted to examine the urine. Yet serious renal lesions must have existed, and I cannot but think that her life would have been saved had chloroform been used as the anæsthetic.

I was interested in Dr. Keen's paper, for the case was my first one of oöphorectomy and the operation was performed *per vaginam*. The operation was not difficult, although the vagina was small. There were marked nervous symptoms after the operation, but no inflammation. The lady had been a patient of Dr. Weir Mitchell for rest cure. She had excessive abdominal pains, profuse menorrhagia and metrorrhagia. Dr. Mitchell recognized a fibroid tumor and requested me to see the patient. The tumor was as large as an infant's head, and we decided to remove the ovaries. This was done on October 4th. On November 20th the patient had been so much benefited that she walked two miles to church. She was in such a state of ecstasy over this, that her mother feared she would lose her mind. After that ill-defined pains returned and there was some bleeding from the vagina. On December 17th I removed a painful neuroma of the cicatrix. The tumor was then reduced in size one-half. In March, 1878, the tumor had become so small that it gave inconvenience by coming down in the pelvis, bringing the womb with it, and I had to insert a pessary. On July 31st, of the same year, I found the tumor merely as large as a horse-chestnut and springing from the

right side of the anteflexed womb. In December she complained of occlusion of the bowel and bleeding at stool, which I attributed to piles. In 1880 there was more or less pain in the left hypochondrium, with more or less nervous phenomena. April, 1882, there had been two slight menstrual flows, with the usual molimina. Later on violent and repeated hemorrhages from the bowel occurred, which were attributed by the patient to vicarious menstruation. For these hemorrhages I removed, in February, 1884, a large mass of piles by ligation, and also stretched the sphincter ani for a fissure. Since then I have not seen the patient.

It is interesting to note the rapid diminution of the large tumor. From the size of an infant's head it was reduced in nine months to that of a horse-chestnut. Neurosis was one of the marked features in this case. The patient is excitable, nervous, and of rare intelligence. When I recall the relief after the first operation, her extravagant delight at walking two miles to church, and the fears for her reason, I must confess that I look for a return of the pain once more, for I cannot see the relation between a uterine tumor and a pain complained of high up in the left hypochondrium. The patient was also highly susceptible to certain drugs, and the only anodyne I could employ was *cannabis indica* in small doses.

DR. M. PRICE: In many cases it will be found that the cause of strangulation of the bowel is adhesion of the small intestine and bands of inflammatory lymph. The pressure and irritation set up slight peritonitis, and finally, adhesions. An early exploration will save life. Handling of the bowel and tearing the adhesions, or snipping them with scissors, will do no harm. Sometimes we cannot distinguish a mass of matted intestines from a tumor, as in the case of a little colored girl I opened the other day. By the time we had separated the adhesions and liberated the intestines there was no tumor. I think that, in many cases, a fatal result may be attributed to the opium treatment. If any one will employ Epsom salts immediately after the patient comes out from the ether, where he now uses opium, he will never regret it. He will regret the use of opium.

As to removing stitches, if we use silkworm gut we need not give ourselves any concern. They may be left indefinitely if we choose. They will bear a strain of fifty or sixty pounds, and give no inconvenience of any kind.

DR. JOHN B. ROBERTS: The case of Dr. White renders it appropriate to refer at this time to the historic case of Dr. Levis, known as the "ethyl bromide death," which led to the abandonment of that anæsthetic in this city. The patient was placed under the anæsthetic for lateral lithotomy, for there were but three or four of us at that time in favor of the suprapubic operation. The skin was incised, but before anything more could be done the patient died. A large, irregular stone, but smaller than this exhibited by Dr. White, was found wedged into the neck of the bladder. The kidney was not markedly diseased, as in Dr. White's case, but there was organic disease of it and of other organs. That death was as independent of operation, and may have been as independent of anæsthetic as was that of Dr. White's patient. I think Dr. White is truly to be congratulated that he had not fixed the day of operation twenty-four hours earlier.

There is another point of interest in both these cases. Such stones can be

much better removed by suprapubic operation than any of the perineal operations.

DR. H. A. KELLY: I had a case of referred pain due to the presence of fibroid tumors similar to that reported by Dr. Keen. There was much emaciation, constant cough, and a pulse of 120. She coughed whenever I touched the tumor. I performed hysterectomy, removing with great difficulty a mass of tumors, amidst which it was impossible to distinguish the uterus. The stump could not be brought up, and was treated intra-peritoneally. Cough has stopped, weight increased twenty pounds, pain is gone, and the patient is in the best of health and spirits.

The indications for the treatment of the various kinds and conditions of hernia are so different that it is difficult to discuss them together.

In one case, which I watched for a number of years through many attacks, I finally made an autopsy. The patient was very fat, and the intestines protruded in a large mass, which could never have been returned to the abdomen, which had so long been accustomed to their absence. The only operation possible would have been splitting the ring to relieve the tension. In this sac I found the colon and the vermiform appendix with small intestine.

I was called last fall to a case of strangulated umbilical hernia, and finding the patient collapsed, and no time to be lost, instructed the husband to give chloroform while I operated with my pocket-case instruments. For suture I employed some embroidery silk lying on the table, with which she had been making doilies. After releasing the intestines I split the ring and brought together the opposite sides, thus obliterating the sac, and curing the hernia permanently. The patient has remained well since.

The stretching of the scar in the so-called ventral hernia after laparotomy is not a true hernia, and not liable to its dangers.

Three weeks ago I saw a man who had developed typhoid symptoms, followed by rupture and escape of fecal matter from the scrotum, due to the strangulation of an old incarcerated hernia of twenty-five years' standing, caused by jumping down a cliff in the Fort Pillow massacre. The hernia was formed by a diverticulum from the bowel, and the whole mass, with the adherent sac, was one gangrenous mass, which was removed in shreds, leaving a large opening in the bowel. I had no good available tissue to close this, and used his right testicle, which I fitted into the opening, and secured by a row of stitches around its circumference, being careful not to allow any stitch to penetrate the substance of the testicle. This has healed perfectly *in situ*, and the bowels have moved naturally and regularly. Some years ago Dr. Hunter reported a case to this Society, in which a man repeatedly pulled his testicle up to support an inguinal hernia, when to his surprise one day it stayed there, and finally became adherent, curing the hernia.

DR. KEEN: I think the difference of locality between lesion and pain, referred to so much this evening, will probably explain the pain in my case. I would like to ask Dr. Goodell which of the tumors in the specimen he would consider the original one?

DR. GOODELL: The intra-mural one. The great diminution would hardly have occurred otherwise.

DR. KEEN: A point elicited in our papers and discussion this evening is the reciprocal invasion of gynecological surgery by the general surgeon, and

general surgery by the gynecologist. Nothing but good can come from this. It will be mutually advantageous.

DR. BARTON: I must bow to Dr. Goodell's authority in the matter of removal of stitches; and yet my own tendency, growing out of experience, is to take them out earlier and earlier. I think that by this I avoid suppuration. There is a difference between the lax abdominal wall after the removal of a thirty or forty pound tumor, and the tense condition of that wall after operations of the class I have been most engaged in. In these the great tension often causes suppuration if they are permitted to remain long. In order to afford support after removal of stitches, I have been in the habit of taking two large pieces of adhesive plaster, and cutting a series of tails upon each, and fastening one piece on each side of the abdominal incision. These plasters are long enough nearly to reach the spine on each side, they are laced in front with heavy thread, and are tightened as necessary by taking up the slack in the thread.

THE LOOFAH, A VEGETABLE SKIN-SCRUB FOR ASEPTIC OPERATIONS.

BY JOHN B. ROBERTS, M.D.

[Read April 11, 1888.]

THE necessity of scrubbing the integument thoroughly with soap and water, in order to remove dirt and secretion, before operating aseptically upon the part, has recently compelled the provident surgeon to carry with him to operations a bristle brush, such as is used for cleaning hands and finger-nails. I have recently saved myself the expense of supplying brushes for emergency operations, and avoided the inconvenience of carrying away from patients' houses such wetted brushes, by using portions of the peeled and macerated fruit of the loofah or towel gourd (*Luffa Aegyptica*). A few of these segments are carried in my operating-case at all times, and, when once used, are thrown away. According to the *London Chemist and Druggist*, this gourd is grown extensively in the West Indies as well as in Africa and Arabia; but I am told it can be cultivated in Philadelphia gardens. It is a cucurbitaceous plant, with fleshy fruit which resembles, in shape and size, the Indian clubs used for calisthenic exercises. When the epidermis, mucilaginous pulp, and seeds are removed from this fruit, there remains the fibrous network or skeleton, which, when dried, acts so well as a scrubbing brush for the skin. This dried skeleton, when wet, is harder than a sponge, though perhaps rather softer than a bristle brush, and acts exceedingly well as a skin-scrub for obtaining an aseptic condition of the skin. I have been able to get with it sufficient friction not only thoroughly to cleanse the skin, but also to produce in a few moments an erythema. This could hardly be accomplished by so soft an article as a sponge, which is, on account of its softness, unsuited for a surgical cleanser.

The prepared skeleton, or loofah, as it is called commercially, is cut, transversely to its long axis, into pieces about two inches long, which, if desired, may afterward be split longitudinally. For my

own use, I prefer the unsplit segment, which seems to have a rather rougher and harder surface, and better removes the dirt and secretions from the crevices of the skin. As the entire loofah can be bought for a few cents, these segments—of which from five to ten can be made from each—cost not more than two cents apiece; to throw them away after using is, therefore, no great extravagance.

It will be understood, I trust, that this material is available for scrubbing the skin of the patient, but it is not suitable for cleansing the spaces under the surgeon's nails; for that purpose I always carry a toilet nail brush. My advocacy of the loofah is for cleansing the skin of patients at whose houses a brush for cutaneous purification is often not readily obtainable, though a new and clean scrubbing brush, such as is used for floors, would be perfectly satisfactory.

I buy the loofahs which I use in private practice, and at the Polyclinic, of Genois & Laubach, 1201 Chestnut Street, who seem to be the chief importers of the article in Philadelphia.

SPECIMENS EXHIBITED.

DR. J. W. WHITE exhibited an

OVARIAN CYST OF THE RIGHT SIDE

which he had removed on the previous day from a patient, in whom a diagnosis of pregnancy had been made and persisted in by an irregular practitioner. After removal of the cyst, at the suggestion of Dr. Joseph Price, he removed the other ovary in the hope of checking the development of a uterine fibroid which was discovered during the operation. The cyst and its contents weighed between fifteen and twenty pounds.

DR. WHITE also exhibited a

LARGE VESICAL CALCULUS,

and the bladder, kidneys, and ureters from a patient who had died in advance of a proposed operation for the removal of the calculus by suprapubic cystotomy. The autopsy showed the existence of pyonephrosis, and Dr. White congratulated himself, that he had escaped the necessity of recording a case of ether-death, or a death from shock, to one of which causes the fatal termination would have been ascribed, and, as the specimens showed, unjustly, had the case lived long enough to come to the operating table.

About five days ago a young man was brought to his office suffering with abdominal pain, but apparently in fair health otherwise. He had a good complexion and there had been no emaciation. The pain was referred to the hypogastrium and the head of the penis, and the symptoms in general were those of stone. A large calculus was discovered immediately the sound passed the prostate, preventing further motion of the instrument. The patient was sent to the German Hospital and placed on a milk diet, rest in bed, etc., and arrangements made to do a suprapubic cystotomy at 2 P.M., on Tuesday the 10th inst. On Monday the pulse was 82, temperature 99°, and the patient was very comfortable except for the fact that diarrhoea had set in, ten or twelve passages with straining having occurred in the twenty-four hours. But as this so often results from a sudden change to milk diet and a rectal tenesmus constantly accompanies vesical tenesmus, little was thought of it. The diet was changed and hourly five drop doses of deodorized tincture of opium ordered. The urine had a heavy deposit, blood, and considerable pus, but that was to be expected with a large calculus. There was no œdema, and, as stated, the general health appeared good. The patient, however, suddenly sank, and died in the night, without operation.

The autopsy showed a stone as large as a duck's egg in the bladder, the tissues being considerably inflamed and hypertrophied, and the calibre of the viscus much reduced. The kidneys exhibited extensive pyonephrosis, very little of their substance being left, and that principally as the dividing walls

of the multilocular cysts into which the organs were converted. The ureters were much dilated, so much, indeed, that at first they were supposed to be part of the small intestine.

There are various ways in which pyonephrosis may be produced from vesical calculus. There may be extension of inflammation through a cystitis involving ureters, etc., or it may originate as hydronephrosis through the vesical orifice of the ureter, damming back the urine. Or the obstruction may be caused by the hypertrophy of the vesical tissues occluding the ureters, or from the frequent urinations due to a phimosis, necessitating, of course, equally frequent contraction of the bladder walls upon the ureters. This case was evidently of long standing and is believed to have originated as a hydronephrosis due to damming back of the urine by the hypertrophy of the bladder walls, causing the great dilatation of the ureters shown in the specimens.

DR. J. M. BARTON exhibited a patient upon whom he expected soon to perform abdominal section: a boy, sixteen years old, presenting a tumor in the left side extending from the diaphragm to the level of the anterior superior spinous process, completely filling and distending the left half of the abdominal cavity; it is hard and dull on percussion. It can be felt in the flank posteriorly in the region of the kidney. There is nothing in the history to indicate an enlarged spleen. Although there has not been hæmaturia, and although we fail to find the colon where we should expect it, in front of the tumor, Dr. Barton considers the case one of sarcomatous kidney and proposes to operate shortly.

TREATMENT OF ACUTE AND CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR (OTORRHŒA).

By LAURENCE TURNBULL, M.D.,
AURAL SURGEON, JEFFERSON MEDICAL COLLEGE HOSPITAL, ETC.

[Read April 25, 1888.]

THE cavity of the tympanum, or middle ear, in health is filled with ever-renewed air by the Eustachian tube, and thus the waves of sound reach the labyrinth and nerve of the ear. It is deeply and securely situated in the temporal bone. It measures two lines from the membrana tympani inward; its breadth and height being about half an inch, and its shape is the form of a cube. The cavity of the tympanum is apparently lined with a continuation of the mucous membrane of the Eustachian tube, and yet the epithelium is distinct,—that of the Eustachian tube is ciliated, whilst in the middle ear it is tessellated, or in squares. This epithelial and subepithelial lining takes the place of a periosteum by transmitting the bloodvessels which supply the bones. This latter fact is important to notice, as any serious affection of this membrane will ultimately react upon the nutrition of the bones forming the cavity, thus resolving a severe catarrh into an otitis. The existence of this mucous cushion is the reason why affections of the middle ear are so numerous in young children. The close contact of the jugular vein to the cavity of the tympanum exposes it to the influence of pus collecting on its floor.¹

In acute otitis media, or inflammation of the middle ear, there are frequently but slight pathological changes in the ear, except swelling, deep redness, and small perforations of the membrana tympani. The discharge is either mucus, or mucus and pus. This can be shown by the pus dissolving in water, and the mucus found floating on the top.

By the use of anodynes, cocaine, chloroform, morphia, etc., pain is relieved; with the internal use of tincture of aconite, antipyrin, frequent

¹ Extract from the author's *Clinical Manual of the Diseases of the Ear*, 1871 and 1878. Phila.: J. B. Lippincott Company.

hot foot-baths, with local depletion, inflammation is checked. The parts should be cleansed with a mild, warm, antiseptic wash, and, as a rule, all goes well. The case generally recovers in a short time, without any permanent injury to the hearing apparatus, if not neglected. You, medical gentlemen, are all familiar with this disease in young persons and children, the latter having as many as two, three, and even four, acute attacks during teething, or the result of the exanthemata or cold. This disease is now so well known, and, as a rule, so promptly treated, that a much smaller number of cases are now permitted to pass to the second stage of inflammation of the middle ear—the purulent variety—which causes such extensive changes in the hearing apparatus. In such cases of acute otitis media Zaufal finds exclusively the two forms of microbes found by Friedländer and Fränkel in pneumonia, viz., a large, short bacillus, encapsulated, and a diplococcus, also encapsulated. He has also shown that the exudation in acute otitis media, before rupture of the membrana tympani, contains pneumococci to the exclusion of all other microorganisms, and that these introduced into the nasal fossæ can give rise to a meningitis without irruption of the cranial envelope.¹

In collecting a large number of cases of suppuration of the middle ear, which includes three or four years, I find that, out of 1700, 454 were acute, while 1246 were chronic; 18 had facial paralysis, while the balance included polypi, caries, necroses, cholesteatomata, and tubercles. Let me dwell, for a short time, upon some of these changes, the most important and extensive of which are found, not in the meatus or that portion of the ear covered by skin, but in the mucous membrane of the middle ear, back of the membrana tympani, extending into the mastoid cells, and through the Eustachian tube to the throat and nose. After this disease has existed for some time, there is an increase of the bulk of the mucous membrane, caused by excessive infiltration with round cells, and enlargement, with new formation of vessels.

The subepithelial layer, stripped of its epithelium, is replaced by round cells; a suppurating, granulating surface, traversed by many vessels takes its place. The purulent process leads to destruction of the tissues, to ulceration and wasting of the mucous membrane, which is eaten away so that the bone is often laid bare.

This is especially the case in tubercular otitis media purulenta, and has been demonstrated by numerous post-mortems, that they tend

¹ Annales des Maladies de l'Oreille, January, 1888.

in a very short time (six to eight months) to extensive necrosis of those parts bordering on the diseased middle ear, and extending into the labyrinth, the rapid course of the disease being due to the existing tubercular diathesis.

It is also often the case in this form of disease of the ear, that tinnitus and impairment of hearing precede the perforation, which is most generally painless, but with rapid destruction of the drum-head. By the transformation of the round cells into spindle-shaped, there occurs a formation of a firm connective tissue, which leads to abnormal adhesions between the membrana tympani, the ossicula, and the walls of the tympanic cavity, producing permanent deafness. The membrana tympani almost always suffers a loss of its structure, and in severe and protracted cases we have large perforations.

Treatment.—These perforations are most ordinarily treated by a combination of alteratives, so as to modify the nutrition and prevent the destructive tendency from gaining headway. The local application is also of importance, especially such remedies or local means as change the surface of the granulations, gently stimulate and cleanse them. No agent in our hands has acted so promptly and well as very finely *levigated* boric acid, alone or in combination with iodol, the latter to act as a true antiseptic, using one part of the iodol to ten of boric acid. Boric acid used alone should be sterilized, by heating before using on a platina foil, as it contains fungi and bacteria when kept for some time. The powder must be carried down to the perforation, and through it as much as possible, so as to reach the diseased mucous membrane and the Eustachian tube with the little instrument I show you. If it is blown in, it adheres to the edges of the auditory meatus, causing irritation, and sometimes small abscesses. This powder has a stimulating and an astringent effect just as alum used in the same manner. It should be packed carefully, so that the diseased membrane be fully covered. It is not necessary to seal it; indeed, it is almost impossible to cause the retention of the pus in the cavity, as the powder absorbs it, and the former when applied produces a watery discharge by its stimulating effect, so that the patient will be obliged to wipe off the liquid.

As to boric acid causing retention of the secretion in the treatment of necrosis of the temporal bone, or in a large perforation, it has not acted so with me. I have used boric acid since 1881, after my return from Europe, and, like its introducer, Friedrich Bezold, of Munich, I have been convinced of its efficacy in these severe cases, and that the objections to its use—i. e., its causing retention of the secretions—as

advocated by some, are entirely without foundation. According to his and my own experience, extending over a period of seven or eight years, its use has always been followed by favorable results, so *he* had no reason to modify his statements made in 1870,¹ as to its therapeutic value. He has also confirmed his opinion of the unreasonableness of these objections by a series of physiological experiments, in which he tested the capacity of absorption of powdered boric acid for fluids outside of the body, before, as well as after, saturation and drying out of the powder with purulent secretion, which, enclosed in a glass tube covered with a perforated membrane, was exposed to the influence of fluids from the ear.

This special mode of treatment is peculiarly applicable to large perforations of the *membrana tympani*; when the perforations are small, they are more effectually treated by a solution of boro-glyceride, carbolic acid, or peroxide of hydrogen.

When the perforation is situated in the *membrana flaccida* or Shrapnell's membrane, with disease of the attic of the tympanic cavity, we resort to a syringe (intertympanic), or a catheter to which a soft rubber ball with a double valve is attached, to withdraw the fluid, and not let it return when diseased; either of which is inserted into the perforation, and the parts washed with a solution of peroxide of hydrogen or an antiseptic. If carious bone be found covered with polypi, the latter should be snared, and the dead bone removed; but if the bone be found only inflamed, it should be treated by diluted nitric or carbolic acid, to stimulate the granulations and restore it to its normal condition. All tearing and cutting operations—as these tend to malignant disease—must be avoided; everything should be done with extreme care and gentleness. When pus blocks the *tympanum* in disease of the middle ear the tuning-fork is heard better through the air than through bone. But when the pus is removed, and the inflammation is reduced, the bone conduction will again improve, as the pressure has been removed from the labyrinth.

It has been found that functional disturbances in hearing are produced by chronic purulent inflammation, by the cicatrices and changes in the *membrana tympani*, and adhesions before referred to in the middle ear, after all discharge has ceased. First, the alterations in tension of the sound-conducting apparatus, caused by the cicatrices producing irregular vibrations in the *membrana tympani*. Second, cicatrices which cause adhesions of the *membrana tympani* with the

¹ Arch. für Ohrenheilkunde, Band xv., and in the *Ärztliches Intelligenzblatt*, 1881, No. 28.

promontory, and the articulation of the incus with the stapes, impeding the power of vibration of the ossicula. Third, if the adhesions are confined to the portion of the membrana tympani situated below the handle of the malleus, the acuteness of hearing has been found to be considerable, while adhesions in the upper half of the membrane produce more disturbance of the hearing, or deafness, especially when the handle of the malleus is drawn inward and ankylosed with the promontory. Fourth, it has been proved that imperfect hearing power may exist even in cases of extensive destruction of the membrana tympani, and with the loss of all the bones, except the foot-plate of the stapes—that is, if it were movable, and the membrane of the fenestra rotunda was not thickened. The regularity of our perception of tones is due to the deadening of the sounds produced by the ossicles, the membrana tympani can only be properly considered as a sound conductor in connection with the ossicles. Even if fair hearing of speech and music remain, the removal of the membrana tympani, or protecting membrane of the tympanic cavity, is dangerous to life, for it is deprived of a covering which is essential to its continuation in health. To retain and to restore to a healthy condition the diseased and ulcerated bones of the ear and the membrana tympani, is of the utmost importance.

Extension of this chronic purulent disease of the ear by the Eustachian tube as a pus-carrier, produces disease of the upper part of the nasal cavity, by developing polypi, enlarging the pharyngeal tonsils, adenoid growths, and hypertrophic enlargements of the turbinated bones and ozæna.

We fully agree with Politzer, that combinations of ozæna with disease of the ear are much rarer than we would suppose, from the extension of the process toward the entrance of the Eustachian tube. Where the ear is implicated, the mucous membrane of the middle ear becomes most frequently sclerosed. In many cases of deviations of the septum we have found perfect hearing, unless complicated with prior ear disease, or exostitis extending through the whole line of the meatus; these are removed by the dental engine. Such cases suffer from coryza or cold in the head, commonly so called, but are promptly relieved by a four per cent. solution of cocaine. There are also many cases of anterior nasal polypus which do not produce deafness.

One of the chief causes of deafness is the extension of the pharyngeal tonsil into the tuberosity of the Eustachian tube, and even into its osteum. In the so-called ethmoiditis of "Woakes" there is not necessarily any causal connection between the ear and these affections;

in many cases the nasal trouble has long existed without involving the ear. If the ethmoid cells become diseased, or necrosed near the Eustachian tube, then we may have paresis of the palate attended with a distressing form of tinnitus, as in one case under our care there was perforation of the membrana tympani from extension of the irritation through the Eustachian tube. In this case the patient recovered under local and constitutional treatment. The removal of the diseased spicula of bone, or hypertrophied tumors from posterior portions of the turbinated bones, improves the deafness of cases of long standing, when attended with retraction of the membrana tympani, the results of naso-pharyngeal disease. There is an absolute necessity that the pressure of the air—which is fourteen pounds to the square inch—should be equal on both sides of the membrana tympani, and all obstructions to this must be removed to attain perfect hearing. It is of importance that our patients, convalescent from chronic purulent ear disease, should breathe through the nose, and be able to shut the mouth, especially when sleeping, to prevent the drying effects on the throat and Eustachian tube. This is accomplished by a mouth-band (see specimen), tied behind the ear, as recommended by Delstanche, in the case of children, after the removal of the cause. The proper treatment of the naso-pharyngeal disease should always precede this, in order to see that nothing obstructs the respiration, and to watch the controverting effects of all operations by the use of nasal tents of laminaria, or those of platinum, or glass covered by soft rubber, and thus keep up nasal intubation.

DISCUSSION.

DR. RANDALL: I have been surprised to hear absolutely no mention in the paper of inflation through the Eustachian tube, so extremely valuable an aid to cleansing, blowing out discharges from the tympanic cavity, and aiding greatly in preventing hurtful adhesions which may interfere with the function of the organ. Inflation by the method of Politzer, or of the catheter, or even of Valsalva, will often be followed by immediate and marked improvement; and will advance the restoration of function.

Dr. Turnbull seems to think that where naso-pharyngeal trouble coexists with ear disease, it is secondary; and is due to the escape of pus from the middle ear into the throat. Most pathologists are inclined to take an opposite view; and, so far as my own experience goes, the trouble in the respiratory passages has been generally of older date. Its nature, in most cases (*e. g.*, deviation of the septum), as well as the history, excludes the possibility of its being secondary to ear disease, or of the latter having had any causal

influence; and I have seen cases where long-continued discharge of fetid pus through the Eustachian tube, though very nauseating to the patient, had little effect on the naso-pharynx. Further, as pointing to a causation in the opposite direction, is the fact that where there is unilateral aural trouble, the side affected is that of the more obstructed nasal chamber. With the general plan of treatment, as advanced by the lecturer, we can all agree. I should, however, once more lay more stress on inflation, so often neglected by the general practitioner, and yet so valuable a measure. Cleanliness is all important. The general practitioner will use the syringe, which is good; but not so good, perhaps, as the dry treatment. It permits of the thorough cleansing required, with less danger of damage in unskilled hands, than if absorbent cotton alone is used; it can be repeated as often during the day as the quantity of the discharge may demand; and if the ear is thoroughly dried after it, inflation being practised to remove all fluid from the tympanum, and the boric powder blown in, the treatment leaves little to be desired. I prefer insufflation, in using the boric powder, to the method described by Dr. Turnbull. It is so much more easily done, and can be practised by the patient himself after cleansing by means of a quill or other little tube connected with a mouth-piece. I fully concur with Dr. Turnbull that there is not much danger of obstruction if the packing be properly done; but I must protest against the "ramming home" sometimes done. I have never seen any trouble at the external orifice of the meatus from the insufflation; on the contrary, the powder tends to allay any inflammation of the meatus; nor have I had the experience referred to, of all the powder blowing back into my face. Inflation, of course, is a measure to be practised with care; I would not often entrust a Politzer bag to a patient; but insufflation is a very simple procedure, and may be left to the patient with entire safety.

DR. SEISS: As a rule, children who breathe through the mouth do so because the nose is so much obstructed that they cannot get sufficient air through it. The forcible occlusion of the mouth by this pad or any other device might, under some circumstances, be very disastrous.

DR. TURNBULL: Dr. Randall is perfectly right in assigning a high value to inflation as a means of treatment in suitable cases, principally of dry catarrh. It often proves very dangerous in unskilled hands, not only on account of its effects on circulation, or the local effect of an excessive pressure, but also the blowing back of purulent secretions from the nose into the pharynx might do much mischief. Before practising inflation cleanse the nose thoroughly. Teach your patients, especially children, to keep the nose clean. Many children do not know how to blow the nose. Teach them that and it will help to a cure. The discharge of purulent matters from the ear into the pharynx, setting up secondary troubles, is not a matter of theory with me, but is the result of experience. A very distressing case of bilateral perforation came under my notice in which hæmoptysis and gastric hæmorrhage had been diagnosed from the vomiting of bloody discharges, which had been swallowed. At the post-mortem examination the stomach contained a pint of putrid and bloody matter.

I do not approve of syringing, as a rule, and it should never be done except by the physician. In the first place, a syringe is a rarity, and an expensive rarity. Even if the instrument is good, in improper hands it may tear the membrane. I have seen such accidents.

CASE OF AMPUTATION OF THE LEFT HALF OF THE TONGUE FOR EPITHELIOMA.

BY GEORGE MCCLELLAN, M.D.

[Read April 25, 1888.]

MICHAEL G., an Irishman, aged forty, was admitted the first of this month to my ward at the Philadelphia Hospital. He stated that he had never had syphilis, and that his general health had always been good—which was borne out by his appearance. He had always been an intemperate smoker of a short-stemmed pipe. Six months ago he first experienced sharp and shooting pain extending from the root of the tongue on the left side down the neck and over the face. A small sore was noticed on the side of the tongue about its middle, which rapidly increased until, at the time of admission to the hospital, it was the size of a half dollar. Articulation and deglutition were interfered with, and there was a constant flow of saliva. There was also, apparently, an enlarged gland in the submaxillary triangle. I diagnosed the disease to be epithelioma, and undertook its removal by amputation on April 11th, just two weeks ago. An incision was made from the symphysis of the chin, a finger's breadth below the jaw as far as the external jugular vein; the deep cervical fascia was torn through with the fingers and knife handle, and the swelling, which was under the sterno-mastoid muscle, proved to be a degenerated gland, or rather cyst, which was filled with thick, cheesy matter. The cyst was evacuated of its contents, the cyst wall torn out as much as possible, and the lingual artery, which was exposed in its relation to the hyoid bone, the hypo-glossal nerve, and digastric muscle, was secured by a ligature. The anterior belly of the digastric was severed, and the mylo-hyoid muscle with the oral mucous membrane punched through with the finger, and the tongue having been freed from its frænum and pierced at its apex with a strong needle and string, was pulled down into the wound in the neck, as I hoped by so doing to be able to take away the diseased portion by the first incision. This proved inadvisable, owing to the short, thick neck of the patient, and would have endangered the carotid and deep vein, and I at once cut through the commissure of the mouth, and, after tying the coronary arteries, pulled the tongue forward, passed a trocar and canula through the middle of its base close to the hyoid bone, the trocar was withdrawn and the chain of an *écraseur* was passed through the canula, and, after withdrawing the latter, I found the *écraseur* worked admirably. I then cut off the affected half of the tongue close to the raphé, and was able to show my assistants that the only bleeding vessels from the tongue itself were at its apex. A ligature secured these, and the

stump was lightly touched with the Paquelin cautery. Both wounds were then united by interrupted silk sutures and dressed antiseptically. There was a rise of temperature to 103° the evening following, which was reduced by quinine suppositories and sponging. Since then it has been about normal. There was a great deal of venous bleeding during the operation, but very little arterial, owing to the early and prompt securing of the lingual and branches of the facial. Cracked ice and iced milk only were allowed the patient for the first twenty-four hours. The wounds were found healed at the first dressing on the third day, and this morning (April 25th) I saw the patient sitting up in a chair dressed and wishing to go out. He has had no pain whatever, and talks perfectly, and takes nourishment better than for a long time before the operation.

CASE OF EXCISION AT THE HIP, FOLLOWED BY AMPUTATION.

By GEORGE McCLELLAN, M.D.

[Read April 25, 1888.]

Riocco V., the Italian, whose limb I amputated after having previously excised the hip, presents some points of unusual interest. He came to this country at the age of eighteen, and while on shipboard had a fall, to which he attributed the trouble in his hip. He worked for six years at his trade as stonecutter, and was finally admitted to the Philadelphia Hospital two years ago, with symptoms of hip-joint disease, and a right basal pneumonia. After recovering from the latter, an incision was made over the great trochanter and pus evacuated, but excision was not done, owing to his generally bad condition. When I went on duty at the hospital, March, 1887, I found the patient with a temperature of 104° , and profuse suppuration. I at once excised the head of the femur below the trochanters, and scraped the acetabulum, which was carious. Instant relief followed, as is evidenced by the chart, and within three weeks of the excision I amputated the thigh. The patient made a rapid recovery, and the wound healed, with the exception of one of the lateral margins, which continued to discharge pus and sanious matter until a piece of drainage tube was removed spontaneously, one month ago. He is now fat and hearty, and, although not a beautiful specimen of humanity, is a remarkable instance of what the system can endure after long exhausting suppuration.

DISCUSSION.

DR. G. G. DAVIS: I would like to ask Dr. McClellan where he tied the lingual artery. It is usually taught that the proper place to expose this vessel is in the digastric triangle. My own experience, in teaching the operation upon the cadaver, is that it may often be more readily found and ligated behind the digastric, thus obviating the necessity of cutting through the mylohyoid muscle. In the hip-joint excision it would be interesting to know how far down the shaft of the bone was removed. If a preliminary resection of the joint and shaft low down is practised, and afterward an amputation through the thigh performed, I believe that the operation will be of much less gravity than if the whole operative procedure is undertaken at one time. Of

course, this refers only to cases in which the condition of the patient is such as to make a primary hip-joint amputation too dangerous.

DR. McCLELLAN: The lingual artery is not difficult to secure. The landmark is the great cornu of the hyoid bone, and by making a curved incision parallel to the angle of the lower jaw, over it, we can readily expose the looped tendon of the digastric muscle and the stylo-hyoideus. Here the hypo-glossal nerve is found, and the lingual artery passes immediately behind it.

It will be remembered that there was a great mass in the neck, probably due to secondary involvement from the growth on the tongue. The first incision was made with the view of removing the gland and bringing out the tongue laterally by the same means of access. The gland was found beneath the sterno-mastoid muscle, and a dissection to expose it would have endangered not alone the carotid but the deep jugular, which I am loath either to wound or to tie. I therefore tore out the cyst after discharging its contents, and then brought into view the parts over the lingual.

In looking over the history of excision of the tongue, I have been struck with the fact that the different methods adopted all have points worthy of consideration in different cases. The operation of cutting through the symphysis is sometimes practised, also the horseshoe sub-mental incision. The lateral operation is applicable only in a long, thin neck. It could not be performed in a short thick neck. The other operation of simply cutting through the oral commissure is very easy and simple, and exposes the parts sufficiently in all cases where the disease is situated behind the middle of the organ. If we simply remember that the deep cervical fascia which loops down the two bellies of the digastric muscle also covers the artery and nerve, we need have no difficulty in finding the lingual, and it is readily distinguished from the nerve which lies in front of it, both upon the cadaver and living patient. The difficulties sometimes experienced in operating on the former are due to the relation of the parts not being properly remembered. As far as I can remember, Mr. Furneaux Jordan was the first who recommended excision of the head of the femur in cases requiring amputation at the hip, in order to diminish shock. The photograph shows long flaps. This is due to the fact that I first excised just below the trochanters, and later at the amputation simply made an incision over the shaft of the bone down to the middle of the thigh. There was very little hemorrhage. The femur was found on removal to be necrosed all the way to the articular surfaces of the condyles.

SOME CASES OF HABIT CHOREA, AND THEIR TREATMENT.

By G. E. DE SCHWEINITZ, M.D.,

OPHTHALMIC SURGEON TO THE PHILADELPHIA HOSPITAL, CHILDREN'S HOSPITAL, AND INFIRMARY FOR NERVOUS DISEASES.

[Read May 9, 1888.]

As is well known, there are certain local choreas for which no definite cause can be assigned, and in which, as Dr. Wood puts it, the movements closely simulate purposive acts. A child suffering with this malady—for it usually occurs in children, especially girls—is brought for treatment because it has adopted some trick of gesture. An eye may be rapidly winked, or the eyeball rolled upward, or the brow wrinkled, or the facial muscles contorted, or, it may be, the shoulder is shrugged, or a forward movement of the head or jaw indulged in. At first these movements are under the control of the will, but gradually become more and more obstinate, and more and more aggravated, especially when attention is drawn to them, and sometimes the variety of the performances in a single day is truly remarkable. This affection has been admirably described by Dr. S. Weir Mitchell, and from him has received the name Habit Chorea.¹

A number of these cases have occurred to me in the past few years, in which the examination and treatment of the eyes have proved of distinct advantage to the patient, and these may prove interesting.

CASE I.—A. B., a girl, aged ten, was referred to me by Dr. Wharton Sinkler, February 2, 1885. This child had been brought to Dr. Sinkler about a year before, and then the following facts were elicited: No history of rheumatism; scarlatina when six years old. General health good, appetite and digestion normal. The movements noted were confined to the orbicularis, the right side of the face and neck, and to the tongue. In spite of the most judicious antichoreic treatment these remained unchanged. The following results were obtained by an eye examination:

O. D. $\frac{15}{XL}$. Amplitude of accommodation 8 D. O. S. $\frac{15}{XXX}$. Amplitude of accommodation 8.5 D.

¹ Nervous Diseases, 2d edition, by S. Weir Mitchell, M.D.

Conjunctivæ injected, slight blepharitis in each eye, and a history of successive crops of styes.

O. D. Small oval disk; choroid ring all around, absorbing at outer side. Retina markedly striated, veiling all edges of disk except the temporal. Many lymph reflexes. O. S. Oval disk, less retinal striation, but inner side of disk veiled.

Atropine solution to full ciliary paralysis was ordered, and the error of refraction determined. This proved to be as follows:

O. D. + 2 s \subset + 1. c, axis 90. O. S. + 2.25 s \subset + 0.60 c, axis 90.

The full correction was ordered, the constitutional remedies continued, and the result was an entire cure of the spasmodic movements.

CASE II.—J. H. B., a lad aged seventeen, referred to me by Dr. S. Weir Mitchell, November 5, 1886. This boy had consulted Dr. Mitchell because he had "got a trick" of twitching his eyes and rolling the balls upward. Before he saw Dr. Mitchell he had been treated with a long course of arsenic and a number of antichoreic and antispasmodic remedies without avail. An eye examination revealed the following points:

O. D. $\frac{15}{xx}$? Amplitude of accommodation 7 D. O. S. $\frac{15}{xx}$. Amplitude of accommodation 6 D.

Conjunctivæ watery and posterior conjunctival vessels injected and tortuous.

O. D. Small nerve, a white patch over central vessels. Retina much striated and general choroidal disturbance, with a halo-like band at the lower and outer side of the disk. O. S. Small nerve. Central lymph-sheath full, and nerve surrounded by a broad halo-like band.

Sulphate of hyoscyamia to full ciliary paralysis was ordered, and the correction of the refraction error determined as follows:

O. D. + 0.60 c, axis 60. O. S. + 0.25 s \subset + 0.60 c, axis 90.

This glass was ordered, and after several months of rest the boy allowed to resume his studies. Ten months later he returned, and the movements had almost absolutely disappeared. His vision then, through the correcting glass, was with each eye, $\frac{15}{xv}$, and the amplitude of accommodation was 10 D.

Through these glasses there was at 30 centimetres an exophoria (insufficiency of the interni) of 4 degrees; no disturbance of equipoise at 20 feet. The abducting power was 7 degrees.

CASE III.—M. E., a girl, aged eighteen, referred to me by Dr. Wharton Sinkler, May 20, 1887. The patient's mother had chorea when a child. The patient herself was perfectly healthy until she was ten years of age. She was then attacked with general chorea, which, however, chiefly affected the face, arms, and the shoulders. At twelve years of age menstruation was established, and the chorea ceased, except for the movements of a spasmodic character, which continued in the face, eyelids, and eyebrows. For a time these grew better, but later, for a space of two years, grew worse, and the habit became more fixed. In April, of 1887, the patient was in fair general health, with occasional dyspeptic attacks and dysmenorrhœa. The movements were now confined to the upper part of the face, and consisted in sudden tight closing of the eyes, rapid raising of the eyebrows, and wrinkling

of the forehead, with to-and-fro movements of the occipito-frontalis, and an occasional jerk of the head and shrug of the shoulder. The movements were not constant, but were increased when attention was drawn to the trouble. The eye examination yielded the following results:

O. D. $\frac{15}{xx}$. Amplitude of accommodation 8 D. O. S. $\frac{15}{xx}$. Amplitude of accommodation 8 D.

Conjunctivæ slightly suffused, distinct dread of light, and the retrotarsal folds studded with numerous phlyctenules. In each eye round disk, slight crescents at the outer sides, and marked retinal striation. Refraction doubtful, fundus best studied with concave glass, probably spasm.

Atropine in full strength was used for four days, and complete ciliary paralysis secured. The vision steadily rose, and on the fourth day was easily $\frac{15}{xii}$, and unimproved by any glass; in short, the eyes were absolutely emmetropic. The mydriatic was continued until all traces of the phlyctenular conjunctivitis had disappeared, and the retinal congestion had subsided. During this treatment the movements markedly decreased, although formerly under the best of internal medication these had stubbornly resisted. About a year later, when last seen, the head movements had entirely ceased; there was an occasional shrug of the shoulder; the eyes were comfortable, the vision and accommodation normal; esophoria 2 degrees at five metres.

CASE IV.—D. G., a boy, aged ten, referred to me by Dr. James C. Wilson, under whose care the patient was for catarrhal jaundice. For some time the boy had adopted the habit of "making faces." This peculiarity had well-nigh ceased during a period when he was laid up in bed with an injury. One movement, however, persisted, viz., a remarkable spasmodic contraction of the right orbicularis palpebrarum almost as complete and decided as if a current had been applied to the motor point. The eyes were as follows:

O. D. $\frac{15}{xv}$. Amplitude of accommodation 9 D. O. S. $\frac{15}{xv}$. Amplitude of accommodation 10 D. Exophoria in accommodation 7 degrees.

Eyelids heavy; caruncles swollen. The conjunctiva, especially of the fornix, reddened and velvety, and the lymph-follicles swollen; slight muco-purulent discharge in the mornings. Reading was an effort, and sometimes occasioned headache.

O. D. Round nerve, central venous lymph sheath full; retina striated. O. S. Oval disk, slightly hazy retina, and full venous lymph sheaths. Cumulative instillations of homatropine were ordered, and the refraction tested and found to be O. D. + 0.65 s. O. S. + 0.50 s.

This glass was ordered for all near work, and the local condition in the conjunctiva treated with boric acid, insufflation of calomel, and later painting with a weak solution of nitrate of silver. Internally Dr. Wilson ordered Fowler's solution in ascending doses.

A month later a letter stated that the eyes were more comfortable, and the twitching was seldom noticed.

CASE V.—S. B., a girl, aged sixteen, referred to me by Dr. S. Weir Mitchell January 9, 1888. This patient was a finely developed girl, perfectly healthy, no history of rheumatism, scarlatina, or fright. She had formed the habit of

rapidly winking, or spasmodically closing the eyes, especially the right one. The movement, at first under the control of the will, gradually became fixed, and was a source of much annoyance and embarrassment. She also suffered from severe brow-ache. An examination of her eyes yielded the following results: O. D. $\frac{15}{xv}$. Amplitude of accommodation 10 D. O. S. $\frac{15}{xv}$. Amplitude of accommodation 10 D. Exophoria in accommodation 7°. The external appearances of the eyes were normal; the conjunctivæ smooth, the vessels free from congestion. Full atropine mydriasis was secured, and the refraction error determined O. D. + 2.25 s. O. S. + 2.25 s.

A full correction was ordered; Fowler's solution was given internally, and one month after the treatment was begun the headaches had disappeared and the spasmodic movements well-nigh subsided.

CASE VI.—A. B., a boy, aged eleven, was brought to me for an eye examination. This lad was of fine physical development, with no family or personal nervous taint, except that he had for some time been noticed to squint his eyes inward, as children often do "for fun," and rapidly close and open his eyes, making at the same time a curious grimace. The boy was very fond of books and this habit was most marked when he was poring over some work which was especially interesting to him. The eye examination was as follows: O. D. $\frac{15}{xv}$. Amplitude of accommodation 8 D. O. S. $\frac{15}{xv}$. Amplitude of accommodation 8 D. No insufficiency. Conjunctivæ suffused, and posterior vessels injected.

In each eye irregularly oval disks; conus; full central lymph sheaths, and general retino-choroidal disturbance. H. = 1.5 D. V. V. higher. Atropine and correction of the refraction error were advised, but the advice was declined. The boy was, however, forbidden to use his eyes for near work as much as possible and given the usual remedies. When last heard from he was reported as better, but the habit spasm still continued.

CASE VII.—W. F. C., aged eighteen, applied for treatment January 17, 1888. His general health was good. No history of rheumatism. Works hard in a factory. A few years ago, when about twelve years of age, had attacks of "chorea," confined to the muscles of the face, chiefly the orbicularis. This passed away under general treatment. For some months past he had acquired the habit of rapidly closing and shutting his eyes, with a quick, snapping movement. No other muscles affected. This was partially under control of the will, but was made worse under examination. The eyes were examined and found as follows:

O. D. $\frac{15}{xv}$. Amplitude of accommodation 8.5 D. L. Hyperphoria 1°.

O. S. $\frac{15}{xii}$. Amplitude of accommodation 8.5 D. Exophoria 2°.

Conjunctivæ injected, but not catarrhal, no phlyctænules or swollen lymph follicles. Small oval optic disks; nasal edges veiled, and coarse retinal striation above and below, veins and central sheaths full. Distinct dread of light.

Atropine was ordered, and continued for several days. Under this the refraction was found to be O. D. + 0.60 s. O. S. + 0.50 s.

These glasses were ordered for constant wear. No constitutional treatment was given. Some months later he was reported as comfortable, so far as the eyes were concerned, and that the nervousness had departed.

These seven cases suffice to give an idea of what service the correction of the errors of refraction was in the treatment of this disorder. In three of them the habit spasm, as Gowers would say, had existed for a long time, and judicious internal medication and proper hygiene had failed to achieve the desired result; which result, however, was attained after the eyes had been thoroughly treated and corrected. In two others the constitutional and the eye treatment were begun simultaneously, and the rapid improvement showed the value of this combination. In one instance the eye examination and the correction of the anomalies of refraction were declined, and the habit still continues. In another, the wearing of the glasses was the only course pursued, and the result was most favorable. In all the cases in which errors of refraction existed, these were either hypermetropia or hypermetropic astigmatism; in two the errors were 2 D. and more; in three, less than 1 D., and in one the eyes were emmetropic. It is not unworthy to call attention to the fact that so low an error as 0.50 D. may prove an exciting cause, the removal of which aids in restoring the patient to a normal tone. Case III. is especially interesting, because here a general chorea disappeared, and in its place came a habit chorea—for there is no doubt that the disorder in this patient is correctly so classified—exactly as Dr. Mitchell has observed, in a few instances, these cases lapse into well-pronounced chorea of the ordinary type. It is further useful to observe that the eyes in this case were emmetropic, but that when the existing spasm of accommodation and phlyctænar conjunctivitis had disappeared under the use of atropine, the patient made rapid strides along the road to recovery. This leads me to speak of the value of closely observing the condition of the conjunctiva, especially of the retro-tarsal folds, in this malady. Years ago, the late Prof. Fr. Horner¹ called attention to the fact that children, when first they attended school, were sometimes observed to be given to undue winking of the eyes, and that without the presence of strong light. As an accompaniment, there were often movements of the muscles of the face, arm, or leg. In these cases the local cause was most often found to be some disorder of the conjunctiva, especially follicular catarrh, blepharitis, or an anomaly of refraction, usually hyperme-

¹ Handbuch der Kinderkrankheiten. c. Gerhard. Fünfter Band. Zweite Abtheilung. Tübingen, 1882.

tropia. Indeed, in a few instances, the local condition was manifestly the exciting cause of a chorea minor. Treatment of the conjunctival catarrh and correction of the hypermetropia, removed the difficulty. Not only may the local conjunctival disturbance and the refraction errors exist, but there may be also imperfect equipoise of the eye-muscles. It is scarcely necessary to refer to this as a possible important factor. In recent times, much graver nervous disorders have been attributed to such insufficiencies of the ocular muscles, and for their correction by surgical and other means, most brilliant results have been claimed.

It is very far from my intention to give an undue importance to these errors of refraction and inflammation of the conjunctiva as exciting agents in the causation of habit chorea. I am not unmindful of the large number of instances that may be directly traced to nasal disorders,¹ to diseases of the pharynx; nor do I forget that other large class to which no adequate cause can be assigned. I only wish to recall to the memory the value of searching for these among the other causes, and to emphasize the facts that, if the habit spasm especially affects the muscles of the face, particularly those around the eye, the following points deserve attention:

1. The condition of the refraction and the muscular balance should be carefully examined, and, if found abnormal, corrected.
2. The anomaly of refraction should be determined under complete ciliary paralysis and the full, not a partial, correction ordered.
3. This correction should be employed in conjunction with proper internal medication and general hygiene, and not to the exclusion of these measures.

DISCUSSION.

DR. S. SOLIS COHEN: I have met, more especially in dispensary practice, with a number of cases similar to those reported. Prof. DaCosta has for many years called the attention of his classes at the Jefferson Hospital Clinics to this group of choreic disorders associated with eye strain, and during my service as Chief of the Medical Clinic, there would be from three to six such cases presenting during the term. In nearly every instance the defect was hypermetropic astigmatism; in most of the few remaining, simple hypermetropia; in one or two, if my recollection serves, simple astigmatism. In order to note the effect of correction of the refractive error, the medication was confined to peppermint water. Some of the cases were affected with facial spasm only,

¹ Jacobi: Amer. Journ. Med. Sciences, N. S., 1886, xci. 517-522.

but a few had spasm of the limbs as well. In one or two cases the spasms were unilateral, though I cannot say now whether the error was also unilateral. My impression is that it was not.

In every case that remained under observation, cure was effected by the correction without medication. Some of the patients disappeared after correction, and in these, presumably, recovery was immediate. In a case now under my care in private practice, a girl complained of frequently falling in the street, from sudden failure, as she expressed it, "of the knees." The eyes were prominent, and the heart rapid, so that a suspicion of Graves's disease was entertained. About a week ago, Dr. Jackson corrected the hypermetropia which he discovered, and to-day the girl reported to me that she had been perfectly well since. The apparent protrusion of the eyes, being due to muscular effort, has disappeared, and the cardiac rapidity has abated.

I presume that the reason we find this association of nervous spasm with hypermetropia rather than myopia, is that the former gives greater and more constant strain upon the muscles of accommodation.

REFLEX COUGH FROM PREGNANCY.

By GEORGE ERETY SHOEMAKER, M.D.

[Read May 9, 1888.]

ALL of us have seen cases where, in the early months of pregnancy, the stretching or pinching of nerve fibres in the uterus has been interpreted, through the medulla, in the muscles correlated in vomiting. All of us know of the reflex sensations, of the vasomotor and trophic changes, of the mental phenomena, and the occasional bowel complications of early pregnancy. Instead of these, in the case which is here related, the sensory impulse travelled from the uterine plexus through other sympathetic paths to the cord, to the medullary centre of the pneumogastric, and out along that and other nerves to the apparatus involved in a cough. The case was as follows :

Mrs. X., aged thirty, very muscular, almost an Amazon in physique. General health apparently perfect. She has had two children, three miscarriages, and is now in the seventh month of her sixth pregnancy. It was in 1885 that she was first seen, while bleeding from a miscarriage at two months. She then stated that, for several days before the uterus emptied itself, she had been troubled by a cough, without expectoration, coming on whenever she laid on her back. It ceased with the loss of the uterine contents.

Second attack occurred six months later, having been well in the interval ; she was again pregnant at two months. No symptoms causing distress now appeared, except a cough, which, for two weeks, had troubled her as soon as she lay down at night, continuing at intervals until she arose, when it ceased almost entirely for the day. No pain, expectoration, or signs of respiratory irritation. A small dose of bromide and chloral, with hyoscyamus, taken in the evening, at once relieved the condition, which, however, returned immediately if the medicine was omitted. The tendency to cough subsided as pregnancy advanced, and the subsequent labor was normal.

A *third attack*, exactly similar, occurred when she again became two months pregnant, in January, 1888. The cough continued for two weeks before she applied for relief, and then was at once removed by the same treatment as before, a sedative given in the evening.

The patient has never had vomiting of pregnancy. Before coming under observation she had had one child and two miscarriages. History of cough with these was uncertain.

Examination showed no malposition or flexion of the uterus, and no lacera-

tion or erosion. The organ was freely movable, with no lateral tenderness; the ovaries normal.

The diagnosis then, in the three successive pregnancies under observation in this patient, has been reflex cough from gestation, without other symptoms.

That large numbers of the symptoms which we daily see are reflex, it is easy to say; but it is by no means as easy to determine the paths of these reflexes, or to see why, in one case, one path should be taken, and in another case another. With the same stimulus to the same group of nerve filaments, the result will be interpreted in vastly different effects. So intricate, too, are the relations of different parts of the nervous system, and so diverse the influences which serve to switch off, as it were, the ongoing nerve impulse in this direction or in that; that in many instances we are obliged simply to record facts, and leave unexplained, because yet unknown, steps which lead to their development.

It will be remembered that the pneumogastric nerve has an extremely wide distribution and connection. That, besides going to the heart, and besides influencing the vasomotor system through the medullary vasomotor centre, it goes to the lungs and larynx, to the pharynx, and œsophagus; that it is connected with the external auditory canal, and with the meninges of the brain; that it goes to the stomach and intestines, to the liver and spleen, and, in short, to most of the abdominal viscera. Its connection with fibres of the sympathetic in the abdomen, enables it to receive impulses from organs such as the uterus, with which direct connection has not yet been fully traced.

While most cough is well known to be reflex from stimulus to pneumogastric fibres in lungs or larynx, the same result may follow a stimulus applied almost anywhere in the distribution of this nerve.

The members of the Society need only be reminded of the cough which occasionally comes from putting a speculum in the external auditory canal, and of that which sometimes follows a disordered stomach; while the writer has now in mind a case of persistent cough, which has resisted treatment for years by the best specialists, and which is, in his judgment, probably due to irritation of the meningeal branch of the pneumogastric in the posterior cranial fossa.

Why the connection with the vomiting apparatus offers the easiest outgoing motor path from the medulla for the reflex impulses from the pregnant uterus, we do not know. The reflex sensory, trophic, and vasomotor paths in pregnancy seldom, if ever, lead to the stomach.

In the case which has been narrated, the easiest path from the medulla led to the respiratory system, probably as the result of idiosyncrasy alone.

THERAPEUTICS OF DIPHTHERIA.

BY A. JACOBI, M.D.,

PRESIDENT OF THE NEW YORK ACADEMY OF MEDICINE.

[Read May 23, 1888.]

MR. PRESIDENT: You have conferred upon me the honor of an invitation to make some introductory remarks to your discussion on the treatment of diphtheria. This invitation I was anxious to accept, if for no other reason than to see the profession of Philadelphia at their home and at work. That I should bring anything new or striking to you, I never for a moment believed, since I have always been in the habit of reading your books and journals and the proceedings of your societies. But it pleased me to infer from the demand that I should appear before you, that I was, to a certain extent, considered one of you, and to prove by my willingness to come that I appreciated the honor offered.

When I considered the subject which is to be the topic of your deliberations this evening, and remembered the vastness of its literature, it became clear to my mind that a digest, ever so small, of what has been written, would fill more than many evenings, and still fall short of accomplishing the object in view. I was aware that I must not come here with literature. You will excuse me, therefore, for only detailing in plain language some of the facts gathered in my contact with diphtheria these thirty years, and the therapeutical measures which I have learned to appreciate and to practise. Thus, I shall not touch upon the large number of panaceas which have ascended like rockets and never were seen again.

Diphtheria is a contagious disease. Severe forms may beget severe or mild forms. Mild cases may beget mild or severe cases. There is probably no spontaneous origin of diphtheria, any more than there is a spontaneous origin of cholera or scarlatina. What has been called follicular amygdalitis (or "tonsillitis") is diphtheria in many, perhaps most, instances. It is seldom dangerous to the patient, because the tonsils have but very little lymph communication with the rest of the

body. But the diphtheritic variety of follicular amygdalitis also is contagious. This mild variety is that from which adults are apt to suffer. It made me proclaim the warning that there is as much diphtheria out of doors as there is in doors; as much out of bed as in bed. With this variety the adult is in the street, in business, in the school-room, in the railroad car, in the kitchen and nursery. With this variety, parents while complaining of a slightly sore throat, kiss their children. Wherever it is suspected, it ought to be looked after. Where it is seen, it ought to be isolated and treated, less perhaps for the sake of those who are sick, than of those who are in serious danger of being infected. This is the more necessary, as this form is apt to last long and give rise to repeated attacks. But it is not only the mild variety which is liable to last long. Serious, undoubted cases are also apt to last for weeks, and some of them months. As long as they do persist they are contagious.

These reminiscences and quotations from former writings must justify the preëminent place I claim for preventive treatment.

Those sick with diphtheria, severe or mild, must be isolated. If barely possible, the other children ought to be removed from the house. This can but rarely be done in the homes of the poor, in the densely populated districts. A great charity is still waiting for its consummation, viz., that of erecting buildings, dormitories, and playrooms for those who ought to be temporarily exiled from their infected homes. A suggestion of mine, before the New York State Medical Society at its meeting of 1882, resulted in the erection of the Willard Parker Hospital of New York, for the benefit of those suffering from scarlatina and diphtheria. The erection of a sufficient number of temporary homes would be a still greater blessing to the poor, and a greater protection to the public at large. If it be impossible to send the well children away, let them remain outside the house, in the air, as long as feasible, and with open bedroom windows during the night, in the most distant part of the house; during the winter on a lower floor. Their throats must be examined every day, and their rectal temperatures taken by the mother, so that the physician may be called on the occurrence of but slight changes. The few minutes spent in this way are amply repaid by the safety they may accomplish. The attendants upon cases of diphtheria must have no intercourse with the well children; though a brief visit of the physician may not render him sick, or dangerous to others, a long exposure affects him or a nurse to a greater or less degree.

The well children of a family in which there is diphtheria, must not

go to school or church. Schools must be closed when a number of pupils have been attacked; or, better still, when there is an epidemic, though it may not yet have affected the school children to a great extent; the teachers ought to be taught how to examine throats, and directed to do so every morning, and send home those children who are suspected.

When an attack of diphtheria has made its appearance, it is well enough to examine the hygienic condition of the house with its deteriorating influences on the general health of the inmates, and to look after the source of the case in the persons of friends, attendants, and help. A family with children ought to insist upon the occasional inspection of the throats of their servants; those with chronic pharyngeal catarrh must not be hired. A seamstress, or laundress, coming for an occasional day's work, sick nurses, children's nurses, and cooks, ought to be examined from time to time, the more so, the more such people are inclined to conceal slight troubles, for obvious reasons. The opportunities for infection are so numerous that it is impossible to sail absolutely free from it. It is easy to imagine how many cases of diphtheria are liable to be disseminated by teachers, shopkeepers, restaurants, barbers, and hairdressers.

In times of an epidemic, every public place, theatre, ball-room, dining-hall, and tavern ought to be treated like a hospital. Where there is a large conflux of people there are certainly many who carry the disease. Disinfection ought to be enforced at regular intervals. In this respect I can but repeat what I said in my treatise (p. 172) and in Pepper's *Cyclopædia* (I. 697). Public vehicles must be treated in the same manner after a suspicious case has been carried; that it should be so when a case of smallpox has happened to be conveyed in them, appears quite natural. Livery stable keepers, who would be anxious to destroy the germ of smallpox in their coaches, must learn that diphtheria is as dangerous a passenger as variola, and what is correct in the case of a poor hack, is more so in a railroad car, whether emigrant or Pullman. I have seen many cases coming to and leaving the city in them. They ought to be thoroughly disinfected in times of an epidemic at regular intervals, for the highroads of travel have always been those of epidemic diseases. Still, can that be accomplished? Will not railroad companies resist a plan of regular disinfections, because of their expensiveness? Will there not be an outcry against this despotic violation of the rights of the citizen, the independence of the money bag? Certainly there will be, exactly as there was when municipal authority commenced to compel parents to keep

their children from school when they had contagious diseases in their families, and when smallpox patients were arrested because of their endangering the passengers in a public vehicle, or taken to a fever hospital for the protection of their neighbors. In such cases it is not society, or the State, that tyrannizes the individual, it is the individual that endangers society.

To what extent the infecting substance may cling to surroundings, is best shown by the cases of diphtheria springing up in premises which had not seen diphtheria for a long time, but had not been interfered with; and best, perhaps, by a series of observations of auto-infection. When a diphtheritic case has been in a room for some time, the room, bedding, curtains, and carpets, are infected. The child is getting better, has a new attack, may again improve, and is again stricken down. Thus I have seen them die; but also improve immediately after being removed from that room or house. If barely possible, a child with diphtheria ought to change its room and bed every few days.

To other rules of protection and disinfection, both private and public, including the prohibition of public funerals, I allude, only for the purpose of referring to the admirable rules published by the National Board of Health, in its *Bulletin* No. 10, of September 6, 1879, and copied in my treatise on diphtheria, New York, 1880, and my article on diphtheria in Pepper's *System of Practical Medicine*, vol. i. p. 698.

Prevention can accomplish a great deal for the individual. Diphtheria will, as a rule, not attack a healthy integument, be this cutis or mucous membrane. The best preventive is, therefore, to keep the mucous membrane in a healthy condition. Catarrh of the mouth, pharynx, and nose must be treated in time. Many a chronic nasal catarrh, with big glands round the neck, require sometimes but two or three regular salt-water injections (1 : 180) into the nose, and gargling if the children be large enough to do so. The addition of one per cent. of alum will often be found useful. This treatment, however, must be continued for many months, and may require years. Still there is no hardship in it, and no excuse for its omission. The nasal spray of a solution of nitrate of silver, 1 : 500 or 1000, will accelerate the cure, and not infrequently has a treatment which was considered obsolete when I was young, been of great service to me. It consists in the internal administration of the tincture of *pimpinella saxifraga*. It is certainly an efficient remedy in subacute and chronic pharyngitis and laryngitis. I generally give it to adults, diluted with equal parts of glycerine and water, a teaspoonful of the mixture every

two or three hours, with the proviso that no water must be taken soon after.

Large tonsils must be resected in times when there is no diphtheria. During an epidemic every wound in the mouth is liable to become diphtheritic within a day, and such operations ought to be postponed if feasible. The scooping of the tonsils, for whatever cause, I have given up since I became better acquainted with the use, under cocaine, of the galvanocautery. From one to four applications to each side, or to the post-nasal space, are usually sufficient for every case of enlarged tonsils or lacunar amygdalitis. It is advisable to cauterize but one side at a time, to avoid inconvenience in swallowing afterward, and to burn from the surface inward. Cauterization of the centre of the tonsils may result in swelling, pain, and suppuration, unless the cautery is carried entirely to the surface; that means to say the scurf must be on, or extend to, the surface. Another precaution is to apply the burner cold, and heat it *in situ*.

Nasal catarrh and proliferation of the mucous and submucous tissue may require the same treatment, but in my experience the cases which require it are less frequent than those in which the tonsils need correction.

The presence of glandular swellings round the neck must not be tolerated. They, and the oral and mucous membranes, affect each other mutually. Most of them could be avoided, if every eczema of the head and face, every stomatitis and rhinitis resulting from uncleanness, combustion, injury, or whatever cause, were relieved at once. A careful supervision of that kind would prevent many a case of diphtheria, glandular suppuration, deformity, or phthisis.

For its salutary effect on the mucous membrane of the mouth, chlorate of potassium, or sodium, which is still claimed by some to be a specific, or almost so, is counted by me amongst the preventive remedies. If it be anything more, it is in a case of diphtheria an adjuvant. It exhibits its best effects in the catarrhal and ulcerous condition of the oral cavity. In diphtheria it keeps the mucous membrane in a healthy condition, or restores it to health. Thus it prevents the diphtheritic process from spreading.

Diphtheria is seldom observed on healthy, or apparently healthy, tissue. The pseudo-membrane is mostly surrounded by a sore, hyperæmic, cedematous mucous membrane. Indeed, this hyperæmia precedes the appearance of the diphtheritic exudation in almost every case. The exceptions to this rule consist of those cases in which the virus may take root in the interstices between the normal tonsillar

epithelia, pointed out by Stoehr but a few years ago. Indeed, many cases of throat disease occurring during the prevalence of an epidemic of diphtheria are but those of pharyngitis, which, under favorable circumstances, may develop into diphtheria. These throat diseases are so very frequent during the reign of an epidemic, that in my first paper on diphtheria (*Amer. Med. Times*, August 11 and 18, 1860) I based my reasoning on 200 cases of genuine diphtheria and 185 of pharyngitis, without a visible membrane.

These cases of pharyngitis, and such of stomatitis and pharyngitis accompanying the presence of membranes, are benefited by the local and general effect of chlorate of potassium. The surrounding parts being healthy or returning to health, the membrane remains circumscribed. The generally benign character of purely tonsillar diphtheria, which is apt to run its full course in from four to six days, has in this manner contributed to secure to chlorate of potassium the reputation of being a remedy, *the* remedy in diphtheria. The dose of the salt must not be larger than 15 grains (1 gramme) for an infant a year old, not over 20 or 30 (1.5–2) for a child from three to five years, in the twenty-four hours. An adult must not take more than 1½ drachms (6 grammes) daily. These amounts must not be given in a few large doses, but in repeated doses and short intervals. A solution of one part in sixty will allow a teaspoonful every hour, or half a teaspoonful every half hour in the case of a baby one or two years old.

It is not too late yet to raise a warning voice against the use of larger doses. Simple truths in practical medicine do more than simply bear repetition; they require it. For though the cases of actual chlorate of potassium poisoning are no longer isolated, and ought to be generally known, fatal accidents will still occur even in the practice of physicians. When I experimented on myself, with half ounce doses, thirty years ago, the results were some gastric, and intense renal, irritation. The same were experienced by Fountain, of Davenport, Iowa, whose death from an ounce of the salt has been impressively described in Alfred Stillé's *Materia Medica*, from which I have quoted it in my treatise on diphtheria. His death from chlorate of potassium induced me to prohibit large doses as early as 1860. In my contribution to Gerhardt's *Handbuch der Kinderkrankheiten*, vol. ii., 1877, I spoke of a series of cases known to me personally. In a paper read before the Medical Society of the State of New York in 1879 (*Med. Record*, March 15th), I treated of the subject monographically, and alluded to the dangers attending the promiscuous use

of the drug, which has descended into the ranks of domestic remedies; and, finally, in my treatise (New York, 1880) I collected all my cases, and the few then recorded by others. Since that time the recorded cases have become quite numerous, and but a few days ago a few new ones were related before the Practitioners' Society of New York. The facts are undoubted, though the explanations may differ. The probability is that death occurs from methæmoglobinuria produced by the presence of the poison in the blood; though Stockvis, of Amsterdam, has tried, by a long series of experiments, to fortify my original assumption that the fatal issue was due to acute nephritis.

The attempts at forming indications for the treatment of patients with diphtheria—I refuse to say treatment of diphtheria—based upon the preconceived or acquired idea as to the nature and causes of diphtheria, are all futile. We know that many cases are undoubtedly of local origin; but there are those in which we require no other proof of its original infectious character than the fact that there is a period of incubation. But all that is indifferent, in view of the fact that the cases we are called upon to treat are, as a rule, or have become, both local and constitutional. It is these we have mostly to deal with.

There is no better proof of the non-existence of a specific in diphtheria than the fact that the pharmacopœia has been exhausted to find one, and new remedies, legitimate and illegitimate, are being recommended all the time as panaceas. While there are certain indications resulting from the characteristics common to all, every case must be treated on general principles, which must be applied to the prominent individual features. When there is a high temperature in the beginning, it requires all the tact of a good physician to judge of the advisability of reducing it by antifebriles, such as sponging, warm bathing, cold bathing, antipyrin, antifebrin, or the subcutaneous use of the carbamide of quinia. Convulsions may demand active treatment, such as chloroform inhalations, or chloral hydrate internally or in the rectum. Vomiting, or other cerebral symptoms, may ask for liquids, or smaller or larger doses of opiates. A very quick and feeble pulse may require a few large doses of a heart stimulant, digitalis, strophanthus, or spartein, in the very beginning.

Renal complications are frequent and occur at an early time. The majority of cases terminate favorably, in some a large amount of albumin will be eliminated in the course of a few days and disappear shortly. But whether your individual case will be of that nature, you do not know, and in time of danger nothing must be taken for granted. Milk or farinaceous diet, plenty of water, or, better, Poland, Bethesda,

Seltzer, Apollinaris, or Vichy, warm bathing, warm feet, a few good doses of calomel, a number of hourly or two-hourly small doses of opium which are better than those of digitalis, and nitro-glycerine, will often prove beneficial. If a diffuse nephritis, such as is more frequently met with in scarlatina, be the result, it impairs the prognosis and requires further treatment conducted on general principles.

To what extent local treatment, if it be possible to employ it, is effective, can best be seen on external diphtheritic surfaces, thus the cutis denuded by vesicatories, the inguinal regions sore with intertrigo, the vagina, circumcision wounds, or tracheal incisions. I have tried almost everything which has been recommended for these conditions, but am most pleased with the effect of iodol, or iodoform powdered, or one part with eight or ten of vaseline. Powders of subnitrate of bismuth, boric acid, or salicylic acid with fifteen or twenty-five its quantity of starch, have not given me the same satisfaction.

Diphtheritic conjunctivitis requires also nothing but local treatment. It consists in the application of small ice-bags, or iced cloths, which must be changed every few minutes, and the frequent instillation of a saturated solution of boric acid, with or without atropia.

The local treatment of the pseudo-membranes of the fauces is a subject of great importance. To look upon them as an excretion which needs no interference, is incorrect. If it were possible to remove or destroy them, it would be a great comfort; but they can be reached only in certain places, and just in those in which they do least harm. Pseudo-membranes on the tonsils are the least dangerous, for their lymph communication with the rest of the body is very scanty. Thus almost all forms of tonsillar diphtheria are amongst the most benign, at least as long as the process does not extend. Most cases of the kind run their mild course in from five to seven days, and it is just these which have given rise to the many proposals of tearing, scratching, cauterizing, swabbing, brushing, and burning. There are cases which do not show the harm done. The fact is that neither the galvano-cautery nor carbolic acid, nor tannin and glycerine, nor perchloride or subsulphate of iron can be applied with leisure and accuracy to the very membrane alone except in the cases of very docile and very patient children. In almost every case the surrounding epithelium is getting scratched off or changed, and thus the diphtheritic deposit will spread. Besides, the membrane of the tonsil is changed surface tissue, as it always is wherever the epithelium is pavement, and not deposited upon the mucous membranes, from which it might be easily detached.

Whatever is done must be accomplished without violence of any kind. If nasal injections be found advisable, they can be made to wash the posterior pharynx and the tonsils sufficiently, so as to render the special treatment directed to the throat absolutely useless. Besides, it is easier, meets with less objection, and gives rise to less exhaustion than the forcible opening of the mouth. This is of very great importance, as I shall show in connection with the local treatment of the nasal cavity. Where it is possible to make local applications without difficulty, the membrane may be brushed with tincture of iodine several times daily, or a drop of rather concentrated carbolic acid. Of powders I know only one, the application of which is not contraindicated, viz., calomel. Even this may irritate by its very form. Everything dry irritates and gives rise to cough or discomfort. Whatever has, besides, a bad taste or odor, such as sulphur, iodoform, or quinia, must be abhorred.

For the purpose of dissolving membranes papayotin, or papain, has been employed. It is soluble in twenty parts of water, and may be injected, sprayed, or brushed on. I have used it in greater concentration, in two or four parts of water and glycerine, in the nose, throat, and through the tracheotomy tube, in the trachea. One of the irrepressible drug manufacturers and advertisers pushes the claims of some modification of the drug, which he calls papoid. For the same purpose trypsin is preferred by others. The mode of its application appears to be the reverse of indifferent. But lately I have seen, in the practice of one of our best known practitioners, papayotin applied in powder, which resulted in constant irritation of the throat while the patient otherwise was convalescent. The pharyngeal hyperæmia and slight exudation disappeared when mild alum washes were substituted.

Steam.—Its inhalation is useful in catarrh of the mucous membranes, and in many inflammatory and diphtheritic affections. On mucous membranes it will increase the secretion and liquefy it, and thus aid in the throwing off of the pseudo-membranes. Its action is the more pronounced the greater the amount of muciparous follicles under or alongside a cylindrical or fimbriated epithelium. Thus it is that tracheo-bronchial diphtheria, so-called fibrinous bronchitis, is greatly benefited by it. Children affected with it I have kept in small bath-rooms for days, turning on the hot water, and obliging the patient constantly to breathe the hot clouds. Several such cases I have seen recover with that treatment. Atomized *cold* water

will never yield the same result. Nor have I seen the patent inhalers do much good.

Still, where the surface epithelium is pavement rather than cylindrical, and but few muciparous follicles are present, and the pseudo-membrane is rather immersed in, and firmly coherent with, the surface—for instance on the tonsils and the vocal cords—the steam treatment is less appropriate. On the contrary, moist heat is liable in such cases to favor the extension of the process by softening the hitherto healthy mucous membrane. Thus it takes all the tact of the practitioner to select the proper cases for the administration of steam, not to speak of the judgment which is required to determine to what extent the expulsion of air from the steam-moistened room or tent is permissible.

Steam can be properly mixed with medicinal vapors. In the room of the patient water is kept boiling constantly, over the fireplace, provided the steam is prevented from escaping directly into the chimney, on a stove (the modern self-feeders are insufficient for that purpose and abominations for every reason), over an alcohol lamp if we cannot do better, not on gas, if possible, because of the large amount of oxygen which it consumes. Every hour a tablespoonful of oleum terebinthinæ, and perhaps also a teaspoonful of carbolic acid, is poured on the water and evaporated. The air of the room is filled with steam and vapors, and the contact with the sore surfaces and the respiratory tract is obtained with absolute certainty.

The secretion of the mucous membranes is sometimes quite abundant under the influence of steam, but still, like that of the external integuments, increased by the introduction of water into the circulation. Therefore, drinking of large quantities of water, or water mixed with an alcoholic stimulant, must be encouraged. Over a thoroughly moistened mucous membrane the pseudo-membrane is more easily made to float, and macerate.

It was for this purpose that pilocarpine, or jaborandi, was highly recommended. Guttmann recommended it as a panacea in all forms of diphtheria. There is no doubt that the secretion of the mucous membrane is vastly increased by its internal application, and by repeated subcutaneous injections of the muriate or nitrate of the alkaloid, but the heart is enfeebled by its use. I have seen but few cases in which I could continue the treatment for a sufficient time. In many I had to stop it because after some days of persistent administration I feared for the safety of the patients. Thus, as early as the meeting of the American Medical Association at Richmond, eight years

ago, I pointed out the exaggerations in the statements of Guttman. There will be but exceptional cases in which pilocarpine will be tolerated long enough to do good. It is one of the remedies by which we may cure our case but will kill our patient.

Diphtheria of the nose is apt to terminate fatally unless energetic treatment is commenced at once. This consists in persevering disinfection of the mucous surface. The disinfecting procedure must not be omitted long because of the general sepsis resulting from rapid absorption from the surface which is supplied with lymph ducts, and small superficial bloodvessels to an unusual extent. Disinfectant injections must be continued every hour, for one or more days. If they are well made, the consecutive adenitis, particularly that about the angles of the lower jaw, is soon relieved and the general condition improved. But there are cases in which not the lymph bodies are the main gates through which constitutional poisoning takes place, but the bloodvessels only. In the incipient stage of such cases the discharge from the nostrils is more or less sanguineous; in them the bloodvessels, thin and fragile, carry the poison inward with great rapidity.

In a few cases injections are unsuccessful. They are those in which the whole nasal cavity is filled with membranous deposits to such an extent as to require forcible treatment. Sometimes it is difficult to push a silver probe through it. That procedure may be repeated, the probe dipped in carbolic acid, or wrapped in absorbent cotton moistened with carbolic acid of 50 or 90 per cent. After a while injections alone will suffice. But now and then the development of pseudo-membranes is very rapid, a few hours suffice to block the nostrils again, and the difficulty is the same.

The liquids which are to be injected must be warm and fairly mild. Solutions of chloride of sodium, two-thirds of one per cent., saturated solutions of boric acid, one part of bichloride of mercury, 35 of chloride of sodium and 5000 of water, more or less, or lime water, or solutions of papayotin, will be found satisfactory. From the selection of these remedies it is at once apparent that the object in view is partly that of washing out, and partly of disinfecting. I have not mentioned carbolic acid, which may be used in solutions of one per cent. or less. Its employment requires care, for much of the injected fluid is swallowed, and proves a danger to children of any age, but mostly to the young.

Most of the syringes I find in my rounds are abominations. The nozzle must be large, blunt, and soft. After having recommended for many years the common hard rubber ear syringe the sharp end of

which was cut off, I now use always a short stout glass syringe with soft rubber mounting in front.

When the children cannot, or must not be raised, I employ the same solutions from a spoon, or a plain Davidson atomizer. These applications can thus be made while the children are lying down, every hour or very much oftener, without any or much annoyance. The nozzle must be large, so as to fit the nostril. A single spray on each side will generally suffice. I am in the habit of covering the common nozzle with a short piece of India-rubber tubing.

For a day or two these injections of fluids or spray must be made hourly. It is not cruel to wake the children out of their septic drowsiness; it is certain death not to do it.

Injections of the nose are oftener ordered than judiciously made. Hundreds of times have I been assured that they had been made regularly, hourly, for days in succession. Still there was a steady increase of glandular swelling and sepsis. I never believe a nurse to have made them regularly unless I have seen her doing it. They *will* run up their syringe vertically and not horizontally, the fluid *will* return through the same nostril. On the successful injecting or spraying of the nares hangs every life in a case of nasal diphtheria. I have long learned to look upon a neglect to tell at every visit how to make an injection, as a dereliction of duty. This may appear a trifling way, but it is a safe one. The nurse must be made to tell you that at every injection the fluid returns through the other nostril, or through the mouth, or is swallowed.

The procedure is simple enough, and need not take more than half a minute for both nostrils. A towel is thrown over the child's chest up to the chin and the child gently raised in bed by the person who is to make the injection. This person sitting on the bed steadies the patient's head against her chest while somebody else holds the patient's hands. The syringe is introduced horizontally by the person sitting behind the patient and gently emptied. No time must be lost in refilling and attending to the other side. When pain is complained of in the ears more gentleness is required, or the spray, or pouring in from a spoon, or minim dropper even, has to take the place of the injection.

Many sins are committed in even doing this simple thing. The unfortunate little one is made to see all the preparations and is worried and excited, and the necessary gentleness in the proceedings is neglected. The cases reported by me in a discussion on the local treatment

of diphtheria before the Section on Theory and Practice in the New York Academy of Medicine, read as follows:¹

"There were two trained nurses, and two children of six and four years. When I saw the little four-year-old the other was dead. Where did he die? His head between the knees of the trained nurse. They had been told Dr. Jacobi ordered nasal injections to be made every hour in such cases. Every hour the unfortunate boy was lugged out of bed, protesting and fighting, and wearing out his little strength in his battle against two trained brutes; had his head rammed between the knees of one of them, who was herself comfortably seated on a chair, while the other did the rest; and thus the boy was murdered. When I heard that fearful story from the smiling lips of that person, I begged and pleaded, and showed her how to do it gently. A week afterward the doctor told me that the little girl died between the knees of one of the smiling creatures, and neither of them is in the State prison."

What is the concentration in which antiseptic injections should be used? For twenty-five years and more, while employing irrigations and injections frequently, I had used quite weak solutions and felt assured of their efficacy. All at once (when the gospel of bacteria was being preached) it was claimed that weak solutions were useless and a snare, because antiseptics, and particularly carbolic acid, would not destroy bacteria and bacteria-poisons except in such doses and concentrations as would necessarily destroy blood and tissues first. I felt dismayed, but still continued in my heretic ways, hoping that improved knowledge would finally harmonize theory and practice. So it happened. In the *American Journal of the Medical Sciences* for January, 1881, T. Mitchell Prudden proved that a solution of one-sixteenth of one per cent. of carbolic acid prevents the emigration of white blood-corpuscles under circumstances otherwise favorable to inflammation, and Koch found that though bacteria are not easily killed, their growth is stopped by a solution of one part of carbolic acid in 850, and their activity by one in 1200. These effects are all that is required for practical purposes; thus the frequency of applications is justified by both necessity and safety.

Diphtheritic adenitis, the swelling of the cervical glands near the angles of the lower jaw, to which I have alluded as an ominous symptom, points to nasal and nasopharyngeal infection. The treatment consists in disinfection of the absorbing surfaces.

Direct local treatment of the glands, if not entirely useless, is, at all events, of minor importance and efficiency. Applications of one part of carbolic acid to ten of alcohol, irritate both surface and patient more than they can do good. Inunctions may do some good by fric-

¹ N. Y. Medical Record, 1887, p. 403.

tion (massage); inunctions with some absorbable material in them may do a little better. The common iodide of potassium ointment is useless; iodide of potassium in three or five parts of glycerine is more readily absorbed; the same in equal parts of water, with a little animal fat, and six or eight times its quantity of lanolin, gives an ointment which is readily absorbed. Iodine is found in the urine within a few hours. Iodoform may be utilized in the same way. Injections of iodoform in ether, which I suggested some time ago, are too painful. Mercurial inunctions, those of blue ointment, require too much time for any effect to take place. Oleates are too irritating locally; a lanolin ointment would prove more satisfactory. After all, however, the readiest method of reducing the swelling of the glands, and improving the prognosis accordingly, is that of cleansing and disinfecting the field of absorption. The rare cases of suppuration in these glands require incision and disinfection. They are as ominous as rare, however. There is but little pus, as a rule, but one or many local deposits of disintegrated gland cells and gangrenous connective tissue. The incisions must be extensive, the scoop and concentrated carbolic acid must be freely used. In these cases hemorrhages may occur, some of them very difficult to manage. I have seen some of them terminate fatally. In these carbolic acid must be avoided. Compression, actual cautery, and acupuncture, have rendered good service. Solutions of iron must be avoided, for the scurf formed is a shield behind which deleterious absorption is going on constantly in such wounds, as it does in the uterus.

Besides sepsis, the great dangers in diphtheria are heart failure and strangulation. The latter has its own indication, to which I shall not allude to-day. Heart failure exhibits itself sometimes quite suddenly; but, as a rule, it is foreshadowed by a gradually increasing frequency, weakness of heart-beats and pulse, and the equal length of the intervals between the feeble systole and diastole, and diastole and systole. This equality is always a dangerous symptom. Heart failure is due, besides the influences common to every disease and every fever, to myocardial changes. These may depend on the influence of the septic decomposition of the blood, and the ill nutrition of the heart-muscle depending thereon, or the direct diphtheritic changes of the tissue, or both. These changes and dangers set in, sometimes, at a very early period. Thus, whatever enfeebles must be avoided. Patients must be spared every unnecessary activity. They must remain in bed, without excitement of any kind, take their meals, and evacuate their bowels in a recumbent or semi-recumbent position; crying and worrying must be

avoided; the room kept airy, and rather dark, so as to encourage sleep if the patient be restless. In no disease, except, perhaps, in pneumonia, have I seen more fatal results from sudden changes of posture, or from exertion. Unless absolute rest be enforced, neither physician nor nurse has done his or her duty.

The threatening feebleness of the heart yields a positive therapeutical indication. In no disease is the danger greater from the side of the heart, in no disease is the indication for sustaining and strengthening the heart more positive from the very beginning. Digitalis, strophanthus, spartein, besides camphor, alcohol, and musk, must not be postponed until feebleness and collapse have set in. It is possible or probable that they will appear; and it is certain that a cardiac stimulant will do no harm. It is safe, and advisable to use them at an early date. That is particularly necessary when antipyrin or antifebrin is given. A few grains of digitalis, in a palatable and digestible form, may, or must, be given daily. When a speedy effect is required, one or two doses of from two to four grains are not too large, and must be followed by smaller ones. When it is justly feared that the effect of digitalis may be too slow, I give, with or without the former, sulphate of spartein. An infant a year old will take one-tenth of a grain four times a day, as a matter of precaution, and every hour or every two hours in an emergency.

Of at least the same importance as cardiac tonics are alcoholic stimulants. The advice to wait for positive symptoms of heart failure and collapse before the life-saving apparatus is employed, is bad. There are cases which get well without treatment, but we do not know beforehand which they will be. No alleged mild case is safe until it has recovered. When heart failure sets in—and often it will occur in apparently mild cases—our efforts are too often in vain. Thus alcoholic stimulants ought to be given early, and in large quantities, though amply diluted. There is no such thing as intoxication or danger from it, in septic diseases. A few ounces daily may suffice, but I have seen ten ounces daily of brandy or whiskey to save children who had done badly with three and four.

Coffee is a good stimulant for the heart. Camphor may be employed to great advantage for the same purpose. From five to twenty-five grains may be given daily, as camphor water, or in a mucilaginous emulsion, which is easily taken. It does not upset the stomach as ammonium carbonate is liable to do. It may be employed subcutaneously when a rapid effect is aimed at, in five parts of oil, which is milder and more convenient than ether.

But the best internal stimulant, in urgent cases, is Siberian musk, in powder or with mucilage. When required at all, it ought to be given in sufficient doses and at short intervals. When ten or fifteen grains administered to a child one or two years old, will not accomplish, within three or four hours, a return of a more satisfactory heart's action, the prognosis is very bad.

Besides exhaustion at the height of the disease, we have paralysis during convalescence, or intense anæmia long after apparent recovery. This anæmia may be general, or is local, and then mostly cerebral.

Diphtheritic paralysis, though of different anatomical and histological origin, yields in all cases a certain number of identical therapeutical indications. These are: the sustaining of the strength of the heart by digitalis and other cardiac tonics. A child of three years may take daily, for a month, three grains or its equivalent; for instance, one grain of the extract. This is an indication on which I cannot dwell too much. Many of the acute, and most of the chronic diseases of all ages, do very much better by adding to other medications a regular dose of a cardiac tonic. It is true that it is a good practice to follow the golden rule to prescribe simply, and, if possible, a single remedy only, but a better one to prescribe efficiently. A prescription paper with a single line on it looks well, but a readily convalescent or well man looks better.

Besides, there are some more indications: mild preparations of iron, provided the digestive organs are not interfered with. Strychnia or other preparations of nux at all events. In ordinary cases a child of three years will take an eightieth of a grain three or four times a day. Local friction, massage of the throat, of the extremities, and trunk, dry or with hot water or oil, or water and alcohol; and the use of both the interrupted and continuous currents, according to the known rules, and the locality of the suffering parts, find their ready indications. The paralysis of the respiratory muscles is quite dangerous; the apnoea resulting from it may prove fatal in a short time. In such cases the electrical current used for very short periods, but very frequently, and hypodermatic injections of sulphate of strychnia in more than text-book doses, and frequently repeated, will render good service. I remember a case in which these, and the occasional use of an interrupted current, and occasional artificial respiration by Silvester's method, persevered in for the better part of three days, proved effective.

Chloride of Iron.—I am still, as I was in my first paper on diphtheria, in 1860, an advocate of the internal use of chloride of iron.

Its mode of administration I have not changed much these twenty years. At a public lecture delivered before a New York audience, by an European authority, whose name has lately appeared a little more prominently in the newspapers than an American physician would wish, I was highly praised for giving a few drops of the tincture of the chloride of iron a few times a day. This eulogy I have always tried not to deserve, for the efficient method of its administration is not that. The chloride of iron is an astringent and antiseptic. Its contact with the diseased surface is as important as is its general effect; therefore it must be given frequently, in hourly or half hourly doses, even every twenty or fifteen minutes. An infant of a year may take three or four grammes a day, a child of three or five years eight or twelve. It must be mixed with water to such an extent that the dose is half a teaspoonful or a teaspoonful; a drachm in four ounces allows half a teaspoonful every twenty minutes. No water must be drunk after the medicine. As a rule, it is well tolerated. There are some, however, who will not bear it well. Vomiting or diarrhoea is a contraindication to persevering in its use, for nothing must be allowed to occur which reduces strength and vigor. A good adjuvant is glycerine, better than syrups. From ten to fifteen per cent. of the mixture may consist of it. Now and then, but rarely, it is not well tolerated neither. When diarrhoea sets in glycerine must be discontinued. Still, these cases are rare; indeed, the stomach bears glycerine very much better than the rectum. In the latter, the presence of a small dose of glycerine is known sometimes to produce large evacuations, a result appropriated and utilized by an advertising nostrum monger.

In connection with this remedy, I wish to make a remark of decidedly practical importance. I know quite well that recovery does not always prove the efficacy of the remedy or remedies administered. But I have seen so many bad cases recover with chloride of iron, when treated after the method detailed above, that I cannot rescind former expressions of my belief in its value. Still, I have often been so situated that I had to give it up in peculiar cases. These are such in which the main symptoms are those of intense sepsis, I should say such in which the iron and other rational treatment was not powerful enough to prevent the rapid progress of the disease. Children with naso-pharyngeal diphtheria, large glandular swelling, feeble heart and frequent pulse, thorough sepsis, and irritable stomach besides, those in which large doses only of stimulants, general and cardiac, can possibly promise any relief, are better off without the iron. When the

circumstances are such as to leave the choice between iron and alcohol, it is best to omit the iron and rely on stimulants mostly. The quantities required are so great that the absorbent powers of the stomach are no longer sufficient for both.

Nor is iron sufficient or safe in those cases which are preëminently laryngeal. To rely on iron in membranous croup means waste and danger.

Mercury.—The first volume of *A System of Practical Medicine by American Authors*, which appeared in 1885, contains, in an article on diphtheria, written in 1884, the following remarks on page 705:

“Not all cases of diphtheria are septic or gangrenous, nor are all the cases occurring during an epidemic of the same type. Some have the well-pronounced character of a local disease, either on the tonsils or in the larynx. The cases of sporadic croup met with in the intervals between epidemics present few constitutional symptoms, and assume more the nature of an active inflammatory disease, very much like the sporadic cases of fibrinous tracheo-bronchitis. These are the cases in which mercury deserves to have friends, apologists, and even eulogists. Calomel, 0.5–0.75 gramme (grs. viij–xij), divided into thirty or forty doses, one of which is taken every half hour, is apt to produce a constitutional effect very soon. Such, with minute doses of one milligramme (gr. $\frac{1}{64}$ th) or more, of tartar emetic, or ten or twenty times that amount of oxysulphuret of antimony, have served me well in acute fibrinous tracheo-bronchitis. But the mucous membrane of the trachea and bronchi is more liable to submit to such liquefying and macerating treatment than the vocal cords. The latter have no muciparous glands like the former, in which they are very copious. And while the tracheal pseudo-membrane, though recent, is apt to be expelled through a tracheal incision at once, that of the vocal cords takes from six days to sixteen or more for complete removal. Still, a certain effect may even here be accomplished, for maceration does not depend only on the local secretion of the muciparous glands, but on the total secretion of the whole surface, which is in constant contact with the whole respiratory tract. Thus, either on theoretical principles, or on the ground of actual experience, men of learning and judgment have used mercury in such cases as I detailed above, with a certain confidence.”

“If ever mercury is expected to do any good in cases of suffocation by membrane, it must be made to act promptly. This is what the blue ointment does not. In its place I recommend the oleate, ten or twelve minims of which may be rubbed into the skin along the inside of the forearms or thighs, or anywhere else when those surfaces become irritated, every hour or two hours. Or repeated doses will be useful such as mentioned before, or hypodermic injections of corrosive sublimate, in one-half or one per cent. solution in distilled water, four or five drops from four to six times a day or more, either by itself or in combination with the extensive use of the oleate, or with calomel internally. Lately, the cyanide of mercury has been recommended very strongly. I hardly believe that it will work more satisfactorily than any other equally soluble preparation. Within the past few years the

internal administration of bichloride of mercury has been resorted to more frequently and with greater success than ever before.

"My own recent experience with it has been encouraging, and so has that of some of my friends. Wm. Pepper gave one thirty-second of a grain of corrosive sublimate every two hours in a bad form of diphtheritic croup, with a favorable result. But in this very bad case, desperate though it was—child of five years, respiration 70, pulse 160—large membrane 'evidently from the larynx' had been expelled before the treatment was commenced on the seventh day of the disease. The solution ought to be given in solution of 1:5000 and in good doses. A baby a year old may take one-half grain every day many days in succession, with very little, if any, intestinal disorder, and with no stomatitis. A solution of the corrosive sublimate in water is frequently employed of late as a disinfectant. It acts as such in a dilution of 1 in 20,000. As healthy mucous membrane bears quite well a proportion of 1:2000 or 3000, any strength between these extremes may be utilized. A grain of the sublimate in a pint or more of water, with a drachm of table salt, will be found both mild and efficient. As a gargle and nasal injection it will be found equally good. But it has appeared to me that frequent applications give rise to a copious mucous discharge; hourly injections into a diphtheritic vagina become quite obnoxious by such over-secretion, which ceases at once when the injections are discontinued. Thus, when it is desirable not only to disinfect, but also to heal the diseased surface, the injections with corrosive sublimate appear to yield a result inferior to less irritating applications."

These remarks of 1884 constitute what I consider a great progress over the statements of my treatise on diphtheria, 1880, which are more cautious and negative. Extensive experience with the remedy increased my favorable opinion of its efficiency to such an extent as to induce me to publish a number of cases and conclusions in the *Medical Record* of May 24, 1884.

They have been amply justified by the observations of the last four years, so that I am fully prepared to commit myself to the following statements: My conviction of the utter uselessness of internal medication in laryngeal diphtheria, membranous croup, is strongly shaken. The mortality of 90 or 95 per cent. of the cases not operated upon has no longer existed these five or six years, in my observation. The above figures were by no means taken from small numbers. For since 1860 I have tracheotomized more than 500, perhaps 600, times, have assisted in as many more operations, and seen at least a thousand cases of membranous croup which were not operated upon at all. During the last six years I have seen no less than 200 cases, perhaps many more. Amongst them, recoveries have not been rare. In the practice of no less a man than O'Dwyer, I have seen two cases of general and laryngeal diphtheria in the same family which got well without any operative procedure. Such recoveries have taken place

in all ages, from four months upward. The uniform internal medication consisted in the administration of the bichloride of mercury. The smallest daily dose was a quarter of a grain (15 milligrammes). Half a grain daily continued through five or six, sometimes eight, ten, or even twelve days, has not been rare amongst children of from three to six years. The doses varied from one-sixtieth to one-fortieth of a grain, and sometimes more. They are given every hour. They require dilution in a tablespoonful of water, or other compatible fluid, for instance milk, in order to be quite innocuous. They are not liable to produce gastric or intestinal irritation. When the latter occurred, it was generally found that by some mistake the solution was as strong as 1:2000 or 1:3000. In the few cases in which it did exist, or was believed to result from the remedy, a few minims of camphorated tincture of opium administered with every dose, for a short period, proved sufficient to check it. The beneficial effect of the remedy depends greatly on the time of its administration. As a rule, such complete stenosis as necessitates surgical interference, develops after days only. This necessity is often obviated by the remedy when given as detailed. When an operation is required after all, the treatment must be continued. I have never since 1863 seen so many cases of tracheotomy getting well as between 1882 and 1886, when the bichloride was constantly used as mentioned. Nor am I alone with these observations. I can name a dozen of New York physicians, some of whom have often performed tracheotomy, who can confirm the above statements from their own observations. Nor does the opinion of those differ who constantly perform intubation. I know that O'Dwyer, Dillon Brown, and Huber have come to the same conclusions, the latter having been a successful tracheotomist before he earned his laurels with intubation.

My experience in regard to the efficacy of the bichloride of mercury is mainly gathered in cases of laryngeal diphtheria, and a limited number of fibrinous bronchitis. It is there where it has been particularly effective. Still, I must not say that they were localized affections. These, with us, are but very scarce. Our cases of diphtheritic laryngitis are mostly decreasing, and complicated with either diphtheritic pharyngitis, or rhinitis, or both. Not a few, mainly of the latter kind, exhibit constitutional symptoms, sepsis. But cases of that kind also I have seen getting well. One of the most interesting was that of a girl of seven years whom I saw a single time in consultation with Dr. J. Anderson. There were nasal and pharyngeal diphtheria, cervical adenitis, and some laryngeal stenosis. I recommended

an hourly dose of one-fortieth of a grain of bichloride, which she took for ten days, also nasal injections of the same, one grain to a pint. They were made hourly for many days, and altogether continued for more than a fortnight, for the patient lived so long, and is still alive. She swallowed almost all the nasal injections, and great was my surprise when, after some weeks, I received the report of the case and learned that about twenty grains of the bichloride had found their way into the stomach of the little girl. She lived, had but little stomatitis, and hardly any intestinal irritation. If the case does not prove anything else, it proves this, that even desperate cases will get well; this case got well with the bichloride of mercury, and resembles all the other cases in this, that after the rational and careful administration of solutions of hydrargyrum bichloride, local mercurial symptoms about gums, mouth, pharynx, and intestines are extraordinarily rare in infancy and childhood.

INTUBATION TUBES.

BY JOSEPH O'DWYER, M.D.,
OF NEW YORK.

[Read May 23, 1888.]

[Before reading his paper Dr. O'Dwyer exhibited tubes with a metallic attachment to replace the epiglottis in swallowing, one of them being so arranged with a spring that the finger might be introduced behind it as an extractor.

In order to illustrate through how small a space breathing can occur, he exhibited a specimen from a case in which there had been no choking of voice or other sign of laryngeal involvement.

Many fear that the tube will slip through into the trachea. A tube was exhibited *in situ*, in a three-year old larynx, showing that this accident cannot occur if the proper size of tube for the age be employed.]

THE testimony of tracheotomists from the time of Bretonneau, has been uniformly in favor of canulas of large calibre. I have failed to find a single dissenting opinion on this question, yet very few have given any reason in support of their conviction, or entered into any arguments whatever on the subject, probably because they considered that none was necessary, as it appears so very reasonable that the artificial channel should approximate as nearly as possible to the normal lumen of the air-passages.

I will refer to a few of the authorities on this subject before giving the reasons that led to the adoption of laryngeal tubes of so much smaller calibre than those generally used in the trachea.

If a large opening be preferable in one situation, it certainly is in the other, the same arguments applying to both.

Bretonneau, for some reason which I have not been able to find, came to the conclusion that the canulas which he first devised were not large enough, and laid down the rule that

"The artificial conduit should always have at least the normal diameter of the glottis of the subject."

"Trousseau endorsed this as an excellent precept, which should never be forgotten."

"Steiner says that as large a canula as possible should be used.

"The first point of importance insisted on by West, as influencing the result of tracheotomy in croup, is the use of a large canula."

The author of the article on croup in Holmes's *System of Surgery*, says that

"As a general rule, both openings in the canula should be sufficiently large to admit as much air as would pass through the rima glottidis in health."

The following is from Reynolds's *System of Medicine*:

"No tube with less than a quarter of an inch in diameter is sufficient to carry on respiration. At a year old such a tube cannot be introduced into the trachea; it would not be tolerated at two years old, so that at these ages some other means must be looked for to secure a passage for the air."

This author then discusses the question as to whether the want of success with tracheotomy in very young children is not due to the inability to secure a large enough opening.

In answer to such assertions as the above, it is only necessary to state that the diameter of the lumen of the trachea at a year old is scarcely a quarter of an inch, and, furthermore, an adult can breathe comfortably while at rest through an opening of this size. I have at present a man under my care who has been wearing a canula in the trachea for the last seven months, the bore of the inner tube being exactly one-fourth of an inch in diameter. During part of this time he was obliged to breathe exclusively through the artificial opening, but then the least exertion, such as walking across the room, was sufficient to induce dyspnœa.

Nature supplied this patient, who is of large stature, with a breathing tube at least seven-eighths of an inch in diameter, and the surgeon substituted one having a breathing capacity of something less than one-twelfth of this. In other words, the area of a cylinder seven-eighths of an inch in diameter is a little more than twelve times that of one a quarter of an inch in diameter.

Had the surgeon who operated in this case placed himself on record, he must have taken extreme grounds in favor of small canulas.

Trousseau advocated larger canulas than were first used, on the ground that in some cases the improvement that at first succeeds the operation of tracheotomy soon gives place to a return of the dyspnœa, and attributes this result to the inadequate size of the canula employed, which does not provide for the permanent admission of a sufficient quantity of air. In illustration of this fact he says,

"Place a quill in the mouth, and, closing the nostrils, endeavor to breathe entirely through it; at first you breathe easily enough, but soon your respira-

tion becomes laborious, and at length you are fain to throw away the quill, and with open mouth once more to fill the lungs completely."

I have tried this experiment with a quill, the diameter of which was three-sixteenths of an inch, and could breathe through it for over five minutes without much discomfort; yet it represents in round numbers only the twenty-second part of the area or capacity of my trachea, estimating the diameter of the latter at seven-eighths of an inch.

If we now construct a canula in the same ratio for a child of five years, the diameter of whose trachea is one-third of an inch, it gives a calibre of three-thirty-fourths of an inch in diameter, an opening about as large as the head of an ordinary sized pin. Trousseau's illustration, therefore, fails to sustain his argument in favor of larger tubes, as it is certain that canulas as small as this were never used.

A more reasonable explanation of the return of the dyspnœa before the lapse of sufficient time for the extension of the disease, would be the entrance of blood, or the accumulation of secretions, because it occurred in only some cases, while, if due to the inadequate size of the canula, it should have occurred in all.

In my early experiments with intubation, the tubes had about the same calibre as those generally used for the trachea, but in order to avoid injury to the vocal cords, which I feared more than anything else, it was necessary to give them the oval or elliptical, instead of the cylindrical form. A few of these early forms I here show you. There was ample room, both in the glottis and trachea, for tubes of this size and shape, but I was not then aware of the hour-glass constriction that exists just below the vocal bands until it was demonstrated by the presence of ulceration through the whole thickness of the mucous membrane, corresponding to the long diameter in every case in which the tube was retained for any considerable time.

This defect could be remedied in only one of two ways, viz., either by diminishing the long diameter at the expense of the lumen of the tube, or by giving it the cylindrical form. The latter, by increasing the pressure on the vocal cords, would endanger their integrity, and I therefore adopted the former, and, as a result, the calibre of the tubes as at present constructed is probably less than half the original dimensions.

The small calibre, consequently, was a matter of necessity, and not of choice, and if the larynx would tolerate no larger without injury, any further argument, so far as intubation is concerned, would be useless. But from the fact that I have failed to find any ulceration at the points above indicated from the tubes as now made, I am satisfied

that the cutting down process was carried further than necessary, and if demonstrated that a larger opening would give better results, this could be obtained without danger to the vocal cords by an increase of the transverse as well as the antero-posterior diameter. The bore of the smallest tube while still in the cylindrical form, which is intended for infants of one year and under, is exactly one-eighth of an inch in diameter. When we consider the size of the trachea at the same age, the disparity is not very great, and still less when compared with the subglottic division of the larynx, which is the narrowest portion of the breathing tube. This part of the larynx being completely surrounded by cartilage, is not subject to any variations in the normal condition, while the chink of the glottis may be greater or less, according to the position of the vocal cords.

I have found that in the adult the diameter of the lower division of the larynx is from one-eighth to three-sixteenths of an inch less than that of the trachea, which reduces the breathing capacity about one-third. I have not made any similar measurements in children, but by comparing a section from the cricoid cartilage placed beside one from the trachea, it does not appear that the area of the former is more than one-half that of the latter; in other words, the disparity is greater in children than in adults.

In the preceding calculations I estimated on the size of the trachea, simply because it was more convenient, but it is evident that in order to arrive at correct conclusions, we must compare the lumen of the canula with that of the infraglottic division of the larynx, because the trachea would conduct air to and from the lungs just as well were it no larger than its mouth.

But, as I have already stated, it was not from any such comparisons with the normal calibre of the larynx that the tubes have reached their present dimensions, but from noting the results of pressure on the intensely inflamed and infiltrated tissues as found post-mortem.

After an experience with tubes of various sizes in over two hundred cases of croup, besides other forms of stenosis in children, I am fully convinced that, as at present constructed, they afford ample room for carrying on the respiratory function in the most perfect manner.

When the disease is confined to the larynx and upper portion of the trachea, it is not an uncommon experience after the paroxysm of coughing that immediately succeeds intubation has subsided, to find the little patient breathing so quietly and imperceptibly that it is sometimes difficult to convince the mother, who has returned to the room after an absence of fifteen or twenty minutes, that her child is

still living. Such complete freedom of respiration would be impossible were the opening too small.

When the struggle for breath has continued long enough to produce extreme exhaustion, together with more or less atelectasis and congestion of the lungs, this perfect relief does not occur. The same is true after the partial asphyxia induced by prolonged or repeated attempts to insert the tube. Such cases sometimes never rally, although air enter the lungs in the freest possible manner.

If any dyspnoea whatever remain for any considerable time after intubation, or if the respiration be much above the normal in frequency, it indicates the presence of some complication or extension of the disease below the tube. The fact that several times on removing a tube from the larynx I have found its calibre considerably reduced by firmly adherent secretions, when there had been no dyspnoea to indicate it, is good evidence that there is more room than is actually required for the free entrance and exit of air.

Physiology teaches us that the muscular system is the great consumer of oxygen, and that when this system is at rest the consumption of oxygen is reduced to a minimum. It has been estimated that as much oxygen is consumed during one hour of active exercise as would suffice for four hours in a state of repose, with food, and for six hours without food. On purely physiological grounds, therefore, if only one-fourth or one-sixth of the amount of air is required in a state of rest, a canula bearing this proportion to the normal lumen of the air passages should afford ample room for the perfect performance of the respiratory function without the least effort whatever.

There would be no point in trying to determine through just how small a fraction of the normal lumen of the air-passages it is possible to carry on respiration effectually, if the only object to be accomplished by the artificial channel were to allow the free passage of air to and from the lungs. There would then be no room for argument, as there could be no objection to having the canula many times larger than necessary for this purpose, for such exists in the normal condition. I will add further, that were there no abnormal secretions to be gotten rid of, there would still be no reason for difference of opinion on this question.

The only ground left for argument, therefore, is the manner in which the machinery concerned in the removal of secretions is modified or injured by a canula in the larynx or trachea.

The mechanism of coughing, as I understand it, is simply getting as much air into the lungs as possible, condensing it, and allowing it

to escape suddenly, on the same principle as the air-gun. To accomplish this, the glottis is firmly closed, coincidently with spasmodic contraction of the expiratory muscles, until the imprisoned air is sufficiently compressed, not only to give it power to project any offending substance before it like the ball from an air-gun, but also to increase the friction between it and the lining membrane of the air-passages to such a degree as to scrape off, so to speak, secretions that may be adherent.

Considerable condensation, with great velocity of the expired air are, therefore, necessary to give the maximum expulsive power. The latter without the former would accomplish nothing, because the same volume of air can be driven through the open or half-open glottis just as rapidly as in the act of coughing, without the least power to remove a particle of mucus even from the larynx, much less from the bronchial tubes. This can be demonstrated by trying to cough while retaining the vocal cords in the expiratory position—the lack of power resulting solely from inability to compress the air to any appreciable extent.

Coughing through a canula is identical with this act when performed with a partially open glottis, and the only means left of subjecting the air to any condensation whatever is the much shorter time occupied in expelling it through the same space by which it more slowly entered.

An excellent and forcible illustration of this argument, and one the mechanism of which is identical with that of coughing, is the familiar act of blowing the nose. There is little or no ability to remove secretions from this organ without first reducing the nostrils to a small fraction of their normal calibre, or by momentarily producing complete occlusion, as in closing the glottis, until the air is sufficiently condensed to force the secretions out with it. Very little power can be developed even by closing one nostril and forcing all the air through the other, if normally patulous. If secretions can be removed more effectually from the air-passages through a canula of the dimensions advocated by the authorities already quoted, for the same reason it should be easier to remove accumulations from the nose without compressing the nostrils.

I claim, therefore, that while the artificial opening must be large enough for the perfect performance of the respiratory function, the power to expectorate is still further diminished, and in exact proportion to its increase beyond this limit.

DISCUSSION.

DR. WILLIAM PEPPER: The evening has been so well occupied in listening to the two important and unusual papers—to me most instructive—that there remains little to say in the way of discussion, save as courteous appreciation of the kindness of our visitors and of our debt to them demands. I rise, then, simply to express our appreciation of the great wisdom of the advice to which we have listened. In regard to the last paper, I wish to add my mite of evidence to the value of the operation introduced by Dr. O'Dwyer. It is destined to fill an important place for these reasons, if for no others: that you can induce parents to assent to intubation, when it is impossible to secure their assent to tracheotomy; that in very young children in whom, as we know, tracheotomy is so difficult an operation, intubation can be performed with great facility; and finally in septic cases, here is an operation for restoration of breathing space by means of an artificial air-tube which does not involve an abrasion of the surface to tempt extension of the infectious process.

From the masterly address of Dr. Jacobi, I am sure that every person present has derived much instruction and much pleasure—stamped, as it has been from beginning to end, with the accents of earnest truth, with the richness of practical experience. It is precisely these details to which Dr. Jacobi has called attention, that are of the highest importance in the issue of our cases. If he had done nothing more than warn us of the danger of relying too implicitly upon trained nurses, he would have done a service. As with every new instrument of precision, after its value has been demonstrated, comes a period in which there is a dangerous tendency to rely upon it too exclusively; so with trained nurses, if we trust too implicitly to their unsupervised discretion, we are consigning our patient to more vigorous, and, therefore, more dangerous ministrations—because equally unskilled—than the untrained solicitude of parents and friends. And this must continue to be the case until a longer and more thorough course of study is insisted upon.

So, too, with the high importance of a radical treatment of antecedent and neglected—because apparently trifling—lesions, which the lecturer has emphasized. It is well for us to bear in mind the warning that tonsillar hypertrophies, nasal catarrhs, and the like may tempt the localization of diphtheria, and I may add of scarlatina and of measles in time of epidemic.

The extreme value of iodoform in local treatment I can confirm. Soluble in ether, miscible with glycerine and with oils, capable of use as powder, it is the best of all local applications, and may be applied to all cases and conditions. I would, however, interpose a mild protest against the too sweeping condemnation of the steam atomizer. Used with that gentleness, so wisely insisted upon, and the confidence of the child obtained, the relief to oppression is so soon recognized that we can secure intelligent coöperation in its frequent and regular use. The problem of internal treatment is the most difficult one a problem which largely and continually occupies our thoughts. I have been glad to hear Dr. Jacobi's clear and outspoken adherence to the mercurial treatment, although he limits it to a certain group of cases. My longer experience has but abundantly confirmed my early impressions of its value—preminently in laryngeal diphtheria whether primary or descending; and I am

constantly impressed with the tolerance of children to the bichloride, and equally to the mild chloride. But I would go further than the lecturer. If in a form conspicuous as a dangerous one, which is usually not primary but associated with rhinitis and faucitis, this treatment proves efficacious, why is it not equally good where the nasal or faucial disease has not extended into the larynx? I have found cases of nasal diphtheria which were a source of great anxiety yield in a most remarkable way, and it has seemed to prevent the local spread as well as septic infection.

I agree with Dr. Jacobi that it is well to begin treatment with the chloride of iron, and that the association of chlorate of potassium is a matter of comparative indifference, and that large doses should be given at short intervals. But I have not been so fortunate in seeing it usually well borne by the stomach. When gastric or intestinal irritation manifests itself, it is well to stop the iron abruptly and to substitute mercurials. Or, when in the beginning of a case the glandular involvement, the faucial tumefaction, the constitutional symptoms, give evidence of rapid sepsis, we cannot depend upon iron and must give the corrosive or the mild mercurial chloride at once.

In an address covering so wide a field there is much room for difference of individual experience. In threatened heart failure, I would appeal for the early administration of strychnine, which I place above digitalis or sparteine or ammonia, above everything but alcohol. These are but slight observations on a subject opened with a breadth and discussed with a richness for which we cannot sufficiently express our admiration.

DR. CARL SEILER: I have only to say that in my experience the addition of chlorate of potassium to the chloride of iron has been of great use, although I agree with Dr. Jacobi that chlorate of potash alone is of little use. From laboratory experiments I attribute this to the disengagement of chlorine gas when the two solutions are mixed. In the same way, at the suggestion of Dr. L. Wolff, I find Labarraque's solution an efficient disinfectant in the proportion of 1 to 5. I use this as a spray to the nasal cavities or fauces, and have had excellent results. I might also say that we should have our carbolic acid solution not only saline but alkaline, and therefore instead of chloride of sodium I add borate and bicarbonate. The soothing effect of an alkaline solution is well known, and I think it frees the surface better from secretions. The solution should be of such a strength that neither exosmosis nor endosmosis shall take place. I see that Dr. O'Dwyer has added an artificial epiglottis to the tube. It has been the experience of all laryngologists to meet with cases of complete or almost complete destruction of the epiglottis by syphilitic or other ulceration, in which there has been no difficulty of deglutition at all. Therefore, I long ago came to the conclusion that it is not the epiglottis which protects the larynx, but the apposition of the ventricular bands. And I would suggest, though I have no experience with such a device, that if the tubes were so made that the head could slip into the ventricles of Morgagni without interfering with the ventricular bands, there would be no difficulty in deglutition experienced. It is not only in New York, but also in this city that the only operation for opening up the air passages that parents will consent to, is intubation. I recall a very distressing case in an asylum, in which the matron would not consent to tracheotomy until the mother of the child had been communicated with, and

while they were hunting the mother the child choked to death. This was before we knew of intubation. That we might have performed at once.

DR. H. R. WHARTON: The hour being so late I must postpone what I had intended to say concerning some of the complications of intubation. As to the calibre of the tubes, the fact that children do breathe well with tubes as now made, is sufficient evidence of the correctness of Dr. O'Dwyer's position. Since my experience of this, I am not so anxious as formerly to get in the largest tracheotomy tubes.

DR. E. E. MONTGOMERY: Since August, 1886, I have performed some thirty or forty intubations, having previously done some twenty-eight tracheotomies. Fifty per cent. of the children intubated have recovered. My experience is that this operation largely reduces the necessity for tracheotomy, and I believe that if intubation were done early in every case, tracheotomy would rarely be necessary. I cannot refrain from saying that I feel that in devising and perfecting his operation, Dr. O'Dwyer has been a benefactor to the medical profession and to the human race.

DR. M. PRICE: In the evolution of steam from lime I have for the last fifteen years depended upon the same method as country people use in the scalding of hogs. Put a few pieces of lime in a bucket with hot water, place a blanket over the bed and let steam pass over the child's head. Soon the child acquires confidence and asks for relief, and will even bend his head down over the bucket trying to get the vapor into his throat.

Now, if every half hour a hot stone or brick or piece of metal be added to the water, it will keep up the heat without any stove or fire being needed in the room. It keeps the room clean and the atmosphere sweet, I have not found so much danger of contagion when lime is used.

I show here a specimen of tincture of chloride of iron in syrup, which is well made and of the proper color. There are very few drug stores where you can get it properly made, and if you don't get the right thing it is of no good whatever. Its greatest good is in its local effect.

DR. SHIMWELL: I have performed intubation sixteen times with seven recoveries. In all there has been immediate relief to respiration. In one case I had to remove the tube twice, and introduce it three times, and perform artificial respiration. In removing the tube post-mortem, I have found it impossible to drag it down through the trachea, so there is no danger of slipping. Is not the occurrence of substernal respiration-depression rather too late an indication to wait for?

DR. EWIN ROSENTHAL: In the mercurial treatment of diphtheria, I have resorted in two cases recently to the sublimation of mercurous chloride from platinum foil. One died and one recovered. The case of death was almost *in extremis* when the treatment was instituted.

THE PRESIDENT, DR. J. SOLIS-COHEN: I have listened with pleasure and with profit to both these papers; and with all the study that I have given to this subject, I have gained information to-night on many points. The advice to give early attention to the heart, that when danger already threatens it may be too late to effect anything with remedies, is advice that we should all take to heart. We have been distinctly taught that the prevention of this complication must be from the beginning an integral part of the treatment.

In regard to local treatment my experience has differed from that of our

distinguished guest. Where it can be properly applied to the extreme margins of the pseudo-membrane I have found the topical use of chloride of iron, by firm and gentle pressure with brush, or, preferably, cotton wad, the most serviceable agent I have used. The drug has an astringent and a disinfectant action, and I am satisfied that I have time and again seen it assist the detachment of false membrane, and apparently prevent the extension of the infection. Concerning the value of chloride of iron internally, the importance of large and frequent doses, the advantage of mixture with glycerine to assist its local effect, I can only confirm what has been said. So, too, as to the bichloride of mercury; I am glad to hear its great usefulness emphasized, and, with Dr. Pepper, I would include all forms of the disease in the field of that usefulness.

Empirical observation has long taught us the pre-eminent value of the chlorine compounds in general in the treatment of diphtheria; and the mercury chlorides, more particularly calomel, however, have always enjoyed a high reputation in the internal treatment of membranous laryngitis. It has pleased me, in these discussions, to hear reasons at least plausibly advanced in explanation of facts which our forefathers learned and used empirically; this is the true direction of medical progress. The topical action of steam is very important. It has always seemed to me that in the natural course of the disease the membrane is thrown off by an accumulation of fluid beneath it which softens it and secures its detachment. We aim, then, by furnishing artificial moisture, to imitate the natural process of recovery. And this leads me to speak of the value of the vapors from lime in the process of slaking. Using a large wash-tub or wash-boiler, and keeping up a supply of large pieces of lime, we secure an abundant disengagement of the hot vapor of water, carrying up with it particles of lime, which mechanically assist by prying up the edges of the pseudo-membrane, and thus favoring the access of the vapor of water beneath it.

There is another method of local treatment which I employed with great satisfaction, more especially in former years, when I saw more of the disease—that is, inhalation of carbolic acid in the spray of a steam atomizer, in very large doses. Twenty to twenty-five grains would be added to the ounce of water, and from half an ounce to an ounce sprayed into the throat every hour, or even half hour, until commencing discoloration of the urine gave evidence of saturation, when the remedy was to be stopped until the urine again became clear. Under this method I would advise the attending physician to see the child four or five times a day, always having the urine last voided saved for him, and when the olive discoloration was noticed to intermit the carbolic acid. This seemed to me to disinfect the system, and thereby improve the local condition, and, at the same time, to prevent or diminish the danger of systemic sepsis. I was not aware, before to-night, that such small doses of carbolic acid, as Dr. Jacobi mentions, could be of service.

I must repeat our sincere appreciation of the obligation under which Dr. Jacobi has laid us by his masterly paper. I am also glad to thank Dr. O'Dwyer for his lucid exposition founded on fact, and proved by actual exhibition of specimens, that the small calibre of his intubation tube is amply sufficient for due respiration. My own experience with tracheotomy

has led me to favor large tubes, the largest that can be introduced without touching the walls of the trachea. I still believe that I have seen life saved by taking out small tubes and substituting larger ones. And I confess that the small calibre of the tube used was one of the theoretical considerations which I enumerated among the drawbacks to intubation. But facts are stronger than theories, and as the small calibre intubation tube does seem to give air enough, and as enough is all that is wanted, I am ready to profess my satisfaction with its present calibre.

I must ask Dr. O'Dwyer to make clear to us the question as to the impaction of membrane. This is not a mere theoretical objection, but is borne out by experience. Perhaps I have been led to attach an undue importance to the matter by an accident which occurred to me a year or so before Dr. O'Dwyer read his now historical paper before the International Medical Congress at London in 1881. I had been called to a case of membranous laryngitis, and had proposed tracheotomy, which had been declined. As I turned to leave the room the mother called piteously, "Oh, Doctor, don't leave my child without trying to do something for it." I said to my assistant, "we will try to save this child," and taking a catheter I cut off the end, and passed the instrument into the larynx. The child instantly became black in the face, and there was nothing for it but, without asking any questions, to plunge my knife into the trachea as the child lay on its mother's lap. I inserted the same catheter through the orifice deep into the trachea, and then we performed artificial respiration; my assistant inflating the child's lungs through the tube with his own breath, and my hands exercising compression of the thorax in respiratory rhythm; and, after a while, we had the satisfaction of leaving the rescued child sleeping peacefully with unobstructed respiration. But I confess that this experience cost me some of the most anxious moments of my life, and has left a fear of the danger of crowding down membrane in front of a tube introduced into the larynx, which may, perhaps, make me overanxious.

DR. JACOBI: The slaking of lime has the further advantage that it is the only way to utilize lime. A lime-water spray is useless, but in slaking a large amount is carried up into the air and air-passages.

The suggestion of the President that carbolic acid should be used in spray until discoloration of the urine is noticed, I do not feel inclined to adopt. Diphtheria is the very disease in which no complication should be allowed to exist, and we must not tempt them. A single case in which we should have to blame ourselves for a possible nephritis would, in my judgment, condemn the treatment. Besides, young infants are sometimes poisoned by very small quantities.

DR. O'DWYER: Pushing down of membrane does occur, though rarely. The difference between the liability to the accident in catheterization and intubation, is that the catheter has an open, comparatively broad end, while the intubation tubes are comparatively probe-pointed. One pushes and catches the membrane, the other slides past it. I have crowded membrane down in only two cases out of two hundred sufficiently to produce asphyxia. In those two, on removal of the tube, the cast was coughed out.

If we take away the tube because the child is breathing badly and the trachea is full of membrane, the child, not having the strength to cough it

out, chokes from the absence of the tube, not from its previous presence. My attention is now being directed to devising a means to get rid of the membrane. I hope to present something practical before long.

Blocking with membrane while the tube is in may occur. Formerly, when the swell of the tube was not so great, it would be coughed out, but now it is not coughed out and suffocation may take place. The original tube was better in this regard.

The earlier tubes were made to fit into the ventricles with the idea of permitting the approximation of the ventricular bands, but it did not work. It is true that the epiglottis is merely an accessory, but in an intubation case the ventricular bands being held open we have to depend upon it; and that is the reason, the dependence being a poor one, that solids and semisolids which can go down in mass are better than liquids.

ACYST OF THE SPLEEN; SPLENOTOMY, SPLENECTOMY? RECOVERY.

By ANDREW J. DOWNES, A.M., M.D.,

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[Read June 13, 1888.]

ON the morning of August 27, 1887, I saw, for the first time, Mrs. B., aged twenty-nine years. She complained of a lump in her left side, which was very painful, but mostly so during the evening and night. Her pulse was 112, temperature 100.5°; she appeared cachectic, and her face was deeply pigmented. On examination I found a tumor situated in and below the left hypochondriac region. By percussion and palpation I marked out a large spleen extending in the axillary line to a point on a level with the crest of the ilium, and transversely from near the spine to beyond the median line of the abdomen. It was very tender on pressure. The salient points of the history I then elicited are briefly as follows: In April, 1886, she first complained of pain in the left side. It came on every evening, and lasted two weeks. It returned again in July for a week. She was again free from pain in her side until November, but says that during this interval she was sleepy all the time and had afternoon fever, but no chills. From November, 1886, to the date of my visit, pain had been constant and had increased in severity notwithstanding treatment.

March 20, 1887, she was confined. The third day after, she had a severe chill and high fever. On the fifth day another marked chill occurred, and at the same time—8 P. M. In October, 1885, two weeks after confinement, she had a chill, but was sick only for a day. These were the only chills she ever had. She first noticed that her side was enlarged in April, 1887, soon after her confinement. In May, a large quantity of fluid was withdrawn from her left chest by Dr. Jewett, of Brooklyn, where she had resided until a short time before I saw her.

The history was not such as to lead to an accurate diagnosis. I detected no evidence of fluctuation at this time. I gave a large dose of quinine, relieving her pain and tenderness so greatly the first night as to incline me to a diagnosis of malarial hypertrophy. Under this impression I treated her with considerable success for three weeks. September 27th, not having visited her for a week, I was sent for. She was suffering from nausea and vomiting, with a pulse of 130, and a temperature of 105°. While out, September 24th, she had taken a severe chill and became very sick. All this time

she had been on large doses of quinine and arsenic. I gave up the malarial idea.

Examining the tumor I found fluctuation. The temperature from September 27th to October 2d reached a daily maximum average of 105°. The last two days I ceased using antipyretics, so little influence had they.

October 3d, with Prof. Roberts Bartholow in consultation, I coincided in a diagnosis of cyst (hydatid?) of the spleen. October 4th, assisted by Dr. Martin Rively, I aspirated the tumor and drew off three ounces of a blood-stained, very offensive fluid, full of flakes and shreds of membrane. October 6th, I aspirated again and obtained the same amount of fluid. This time, with the fluid came a small piece of tissue, which, on examination, proved to be spleen tissue. October 9th, I aspirated again, but obtained no fluid. The little fluid I withdrew on the first two occasions lowered the temperature two degrees. I was sure of fluid, and its septic character was only too evident. I knew a cavity was present and probed it with the canula. The woman was moribund. I determined to open the spleen and give her a chance for life.

October 14th, assisted by Drs. Joseph Hearne and Martin Rively, I performed splenotomy as follows: Selecting the most prominent and fluctuating part of the tumor, I made an abdominal incision, one and a half inches in length, beginning an inch below the costal end of the tenth rib (on a line with the nipple), and directing it obliquely toward the umbilicus. It included everything to the peritoneum. Spreading the lips of the wound apart, an oval surface of peritoneum was exposed, through which a trocar was introduced and fluid found. Corking the canula, I introduced twelve silver wires from the margin of this oval surface in through the peritoneum, capsule, etc., and out through the skin. And having twisted the wires, thus closed the peritoneal cavity from the splenic. I now removed the canula, entering in its place a grooved director, along which I made an incision into the spleen. A large quantity of fluid escaped, the first to appear being like that removed October 4th, but it soon consisted almost of blood. It was evidently septic. I was surprised to find no cyst. The walls of the cavity I opened into were pulpy and clotty, disintegrating and bleeding spleen substance. With my index finger I could reach close to the crest of the ilium—beyond the median line and up beneath the lower rib, finding it necessary, however, to break through spleen tissue. Hemorrhage soon began to lessen. I irrigated as well as I could, introduced drainage tubes, and dressed with absorbent lint and bandages.

Though the shock and loss of blood were considerable, the benefit of the operation was soon apparent. At 4 P.M., just prior to interference, the patient had a pulse of 128, and a temperature of 104°. At 6.30 P.M., the pulse was 112, the temperature 100.5°.

October 18th, or four days after operation, I removed the sutures. A marked diminution of the size of the tumor had occurred. The spleen substance could be felt as ragged pieces lining the cavity. Some of the most detachable pieces I removed. The discharge had been very free, sufficient to saturate heavy dressings three times daily. Its septic character, and the fact that the opening, the patient supine, was the highest point of the cavity, indicated the necessity of a deep counter-opening.

October 28th, I made an opening half an inch wide at the free end of the

last rib. With this second opening, from its deepest part, I had control of the cavity and with a tube in each opening was able to wash it out thoroughly, and drain it freely.

November 5th, after removing a piece of spleen from deep down behind the ribs there occurred quite a flow of pus. It was a grayish fluid, and the microscope showed the corpuscles granular and disintegrated. Though I searched diligently I cannot say I found a hooklet. This was the first pus I had met with. The retraction of the capsule, at this date, had advanced to such a degree that the lower margin of the tumor was just below the border of the ribs.

November 18th, a piece of tissue protruded from the upper opening. It was attached below. On removal it proved to be a piece of membrane about two square inches in area. Was not this part of a cyst wall? The splenic tissue could be felt more distinctly after its removal. It came from the centre of the mass, not the confines, hence it was not a piece of the thickened capsule. With its removal the discharge of pus, which began November 5th, ceased.

November 16th, I removed with finger and forceps quite a mass of spleen, in bulk nearly as much as a normal organ. The following day the patient was extremely pale.

November 26th, all the spleen I could detect was a small piece in the left inner and upper wall of the cavity close to the diaphragm.

November 30th, the pulse was 104 and the temperature normal for the first time.

December 2d, the discharge became a dirty, chocolate-colored, granular matter. Splenic débris I called it.

December 22d, the sloughing débris ceased to appear. I considered the spleen substance entirely removed.

December 23d, at 4 P.M., after irrigating I inserted a curved uterine forceps five inches deep, toward the outer axillary border of the cavity, and spread the blades apart. A profuse hemorrhage, even to syncope, occurred. Plugging with lint finally arrested the bleeding. The blood was arterial. What bled? One of those small branches, I believe, into which the splenic artery ramifies at the hilum of the spleen. One of these feeding the capsule was, no doubt, torn by the blades. It bled too freely, I thought, to be due to tearing of adhesions. At 9 P.M. I was sent for. The patient was very low. The pulse was scarcely preceptible at the wrist. Her hands and feet were cold, her tongue pale, the tip actually white. Her eyelids were very oedematous. The abdominal wall was retracted and wrinkled, as in cholera. She was a picture of hydræmia. Not for three days did the puffiness of the eyelids disappear, or could the patient sit up without vertigo.

January 12th, the primary opening was allowed to close, and I expected soon to see the counter-opening close.

January 21st, I had not seen the patient for three days. The discharge had been slight. The silver tube, two inches long, which I had lately used to drain the cavity, was nearly out. I removed, cleaned, and then introduced it its whole length, when there gushed out five ounces of a purulent, non-offensive fluid, containing flakes and pieces of tissue like broken-down fibrous tissue. Was not this breaking down capsule and annexed inflamma-

tory adhesions? The capsule, bereft of its spleen, was without function, and nature was throwing it off as useless. The cause of this collection of fluid was as follows: thinking everything about out of the cavity that was to come, I had gradually withdrawn the tube until the end entered not into the cavity, or perhaps became choked by a piece of tissue. Sloughing still continued, and the product was unable to find exit.

From this date I kept in a six inch rubber tube, irrigating frequently, and using afterward an emulsion of iodoform, which effectually prevented the discharge from becoming septic.

Thus it continued until February 21, 1888, when, assisted by Dr. D. M. Taylor, of New York, I enlarged the counter-opening to the width of one and a half inches, and was thus enabled to get two fingers up beneath the ribs and feel for some distance a smooth surface which I considered diaphragm. All the way up to this surface could be felt thick bands of fibrous tissue. I aimed at closing this cavity from the bottom. It became a sinus which very slowly narrowed and shortened, until to-day it is but three inches deep and holds a tube of one-quarter of an inch calibre.

If the foregoing be analyzed, it will be seen that, excepting some small portion beyond reach and attached to the diaphragm, I had removed all the spleen by November 26th, six weeks subsequent to the splenotomy. By December 22d, even this remnant had sloughed away, and everything indicative of retained spleen had ceased to appear. In this statement I am leaving the thickened capsule out of consideration. From December 22d, the condition was that of an indolent cavity lined by fibrous tissue, the thickened capsule, and adhesions. This tissue had to come away, and would have done so much earlier were the cavity in a different situation; but here, with the stomach and bowel changing their capacity from time to time, on one side, and the prominent ribs more so from emaciation, on the other, there was no way of making pressure; hence air could not be prevented from entering the cavity, rendering it septic and indolent.

The dangers of the case were hemorrhage and pneumonia. October 14th, the patient was moribund. Dr. Hearn gave ether. Her condition, the ether, and subsequent exposure to a draught caused a bronchitis, which in the following two weeks gradually developed into a marked case of broncho-pneumonia of the right chest, helped on to some extent by the administration of morphia, indicated by extreme restlessness. By November 5th, the pneumonia became a pleuro-pneumonia of a very painful type. But it seems as if the pleurisy was conservative, for the inflammation with its occurrence reached its limit, and the lung condition gradually cleared up, contrary to my faintest hope.

But the chief danger was hemorrhage. For the first six weeks

there was a continual loss of blood; and whenever any spleen was removed, no matter how small the piece, bleeding occurred. The continual oozing from the spleen prepared for the removal of the greater part of it with a minimum loss of blood at the time. In character its tissue was chiefly fibrous, with considerable contractility, and did not regain blood as freely as it lost it; hence, it became less vascular the more it oozed. But when the part removed had considerable thickness, the deeper layer was actively red, and bled freely. A little pressure with the finger over the bleeding area, hot water irrigation, or, in case of failure from these, plugging with lint or gauze, always arrested it.

The extreme condition to which she was reduced by the loss of blood and the attack of pneumonia was shown, October 25th, in a serous discharge from the left ear, which continued for some time, while at the same time occurred a singing noise in the right ear, ending in complete deafness of that ear, which lasted two weeks.

As to remedial measures I have little to say. Alcoholic stimulants fulfilled a useful purpose; at times I used them very freely. But I must say that, second to opening the spleen, hyoscine hydrobromate saved the woman's life. She passed nights and days without sleep—a hyper-nervous condition, due to anæmia and exhaustion. At the same time she had pneumonia. I tried all the hypnotics, only to fail; at last I reached hyoscine, and obtained the happiest result by combining $\frac{1}{100}$ grain with $\frac{1}{2}$ grain of morphia. With this dose hypodermatically every night, I had control of her nervous system.

Remarks.—The diagnosis of the case cannot be hurriedly dismissed. October 3d, I agreed with Prof. Bartholow that it was a cyst, and probably hydatid. The points leading to this conclusion were, besides the physical signs, the duration of the case, its gradual development, the exclusion of malarial disease, and a history of the patient living four years prior with a family possessing six dogs. The following few days I aspirated particularly to establish the character of the fluid. Chemically and macroscopically it exhibited the characteristics of hydatid fluid—a sanious fluid, containing flakes and membrane, and a large amount of chloride of sodium. Microscopically, I could not say I found a hooklet. Rupture of the cyst, extravasation and decomposition of its contents, might explain their absence. But, whatever doubt I may have been in, after opening the spleen and finding no distinct cyst, cleared up November 13th, when I removed the piece of membrane which I show you. I believe it to be part of a large cyst wall. One surface is pyogenic, for the sac must have undergone

inflammation; the other surface is rough with attached portions of spleen.

The gradual development, duration, and character of the symptoms are against abscess. Even the pus was not the characteristic chocolate, icterous kind belonging to abscess.

The spleen tissue, of which I made many sections, shows a marked hypertrophy of its fibrous framework, fibroid degeneration of its follicles, and almost complete absence of its pulp—splenic hyperplasia. What was the cause? In the beginning, probably pressure, then rupture perhaps of a small cyst causing irritative or septic inflammation of the spleen as a whole. The size of the organ was due more to the hyperplasia than the cyst, which was entirely beneath the ribs, the remainder of the tumor to the crest of the ilium being hypertrophic spleen. And hence the late diagnosis of cyst. Such was the condition of things up to September, 1887. At that time I believe the cyst deep beneath the ribs, of which I obtained the wall, ruptured and caused the aggravation of symptoms that developed at this time and called for operation. It was the extravasation of fluid out of the cyst that caused increased abdominal prominence and allowed the detection of fluctuation. As of interest, in this connection, I have a note dated May 25, 1888, from Prof. Charles Jewett, of Brooklyn, who saw the patient in that city in May, 1887. He writes that he found an abdominal tumor, extending from the level of the crest of the ilium up behind the lower border of the ribs on the left side, which he identified as spleen. On aspirating the tumor, he obtained a few drachms only of a thin, grumous, bloody fluid, and concluded the spleen was in a condition of degeneration. He also drew off between one and two quarts of what appeared to be pleuritic fluid, on aspirating the left chest, by puncture, just below the scapula and midway between the mid-axillary line and the spinal column. No examination of fluid was made. The needle was passed far enough only to perforate a thin chest wall. He considered the effusion as secondary to the trouble in the spleen.

My claim to performing splenectomy may be questioned. First, because I did not remove the spleen by a single technical operation. Second, because it doubtless will be said that only postmortem could I prove the absence of the organ. The first objection I would answer thus: The term ectomy can have at least practically no reference to the time taken or the means employed in the removal of an organ, except the initial use of a knife. It may be done in one operation, it may require twenty. If the organ is removed completely by

deliberate interference, it is an ectomy. This was technically an intracapsular splenectomy; for the spleen substance was removed from within its capsule. Not one piece was removed to which was attached a piece of capsule. But the subsequent history of the capsule I have already given. It was thrown off by nature as useless, but slowly, on account of its thickness. Hence the whole organ, the spleen and its capsule, was removed—a splenectomy.

As to proving that the organ is entirely gone, I would say this, though it is but a repetition. By November 26th, only a small piece of spleen could be detected. Then began to appear a granular débris the result of sloughing of this piece. By December 22d, the débris which I considered characteristic of sloughing spleen ceased to be discharged. February 21st, when I was able to get two fingers up under the ribs along the diaphragm, I would have detected spleen tissue if any existed. And if it was there, the curetting surely would have exposed it. Hence I conclude none remains.

The condition of the capsule I believe to have been an element of safety. Whenever I aspirated the tumor, the needle, after piercing the skin, seemed as if passing through leather. The patient remarked that all the other physicians who had aspirated or injected the organ were surprised at the toughness and density of its covering. In the lips of the wound made to enter the spleen, the unusual thickness of the capsule was plainly visible. It was thickened from capsulitis. A knowledge of this made me less timid in stripping off spleen from the capsule and insured less danger from hemorrhage.

The blood examined shows strongly a large increase in the white cells, but not more than a person losing as much blood as she has lost would be expected to show. An accurate count was not taken, because she was never deemed to be suffering from a blood dyscrasia, and her spleen was so gradually removed and with so much hemorrhage, that no conclusion could be drawn from an examination of the blood. She is very anæmic, and has not menstruated since before the operation. I can find no enlargement of lymphatic glands. A symptom said to follow removal of the spleen, namely, an enormous appetite, she did have for about a week in December, the time the last of her spleen disappeared.

In concluding, I would call attention to the chief thing of interest in this case—the gradual, piecemeal removal of the spleen. The question of cyst is of secondary importance. It is, I feel certain, the first time that the spleen has been deliberately, though gradually, removed from within its capsule. It establishes this precedent, that

a hypertrophic spleen undergoing septic degeneration can, with safety, be opened and although slowly, yet successfully, be removed piece by piece.

DISCUSSION.

DR. GOODELL: I wish to congratulate the reader upon the happy issue of this admirably managed case, but I really do not see how he can call it a splenectomy. The matter of a name is important here from its bearing upon statistics. This case seems to me to be a splenotomy with sloughing of the spleen: nature did the splenectomy. Splenectomy is a very dangerous operation; the percentage of deaths in all recorded cases being seventy-one. In leukæmic spleen it is almost always fatal, there having been but one recovery in some twenty cases. In hypertrophied spleen it is also very fatal; one recovery in fourteen recorded cases. In wandering spleen, on the other hand, the pedicle being lengthened, the organ is got at with less difficulty and the great majority recover. So, too, in splenotomy for cysts the great majority recover.

I once did a splenectomy, though unwittingly. The mass was adherent to the omentum and I thought I was removing an omental sarcoma. The diagnosis previous to operation was ovarian or omental tumor, sarcoma in all probability. Examination showed it to be a leukæmic spleen, which weighed six pounds. The patient died in a few days from embolism. Although the case of Dr. Downes should not be recorded as a splenectomy, he showed just as much skill and just as much pluck as if it had been a case of splenectomy.

DR. G. G. DAVIS: There is an interesting question here as to the etiology. The case was septic when Dr. Downes saw it, but what was the origin of that sepsis? The germs must have been introduced from without and probably through the trocar at the first tapping, as in cases of pleural effusions which are at first serous and then purulent. May it not have been a case of hypertrophied spleen rendered septic by repeated tapping with septic trocars.

DR. DOWNES: I expected the name to be objected to. Nature did not begin to remove any of the spleen until six weeks after I had begun my work, and when, with the forceps and fingers, I had taken away as much or more tissue than the bulk of a normal spleen.

THE MANAGEMENT OF DELIVERY PRIOR TO THE SEVENTH LUNAR MONTH.

BY WILLIAM H. PARISH, M.D.

[Read June 13, 1888.]

IN the management of delivery prior to the seventh lunar month, the welfare of the mother is alone considered. The non-viability of the embryo or foetus removes it beyond consideration. It is true that the question as to whether the threatened abortion or miscarriage is inevitable or not will frequently arise, and will challenge our most anxious study, for upon the continuance of the pregnancy hangs the life of the intrauterine being if it is still living. It is my purpose, however, in this brief communication to discuss the management of only the inevitable deliveries prior to the viability of the offspring, and not to treat *in extenso* of any other part of the general topic of abortion or miscarriage.

The impossibility of ascertaining the number of abortions occurring in any large community has been generally recognized, so that the conclusions based upon figures given as to the proportional ratio of the number of deliveries of non-viable children compared with labors after the seventh month are unreliable. It is my belief, also, that the mortality following abortion or miscarriage cannot at present be arrived at even to an approximative degree. The desire to conceal the cause of death either because of the illegitimacy of the pregnancy, or because of criminal interference, or because of the known tendency of the gossiping to ascribe all such deliveries, especially if fatal, to criminal interference, leads to the writing of misleading certificates. Some of the deaths ascribed to septicæmia, or pyæmia, or typhoid fever, etc., are deaths following abortions or miscarriages. Treatment must be based, however, not only upon the actual risk of a fatal result to the mother, but also upon a full appreciation of the fact that improperly managed deliveries of non-viable offspring entail upon the woman a number of serious conditions. Subinvolution of the uterus

and of all the structures functionally associated or closely related by position is of frequent occurrence. Septic endometritis with septic endosalpingitis, ovaritis, and localized peritonitis, adhesions, crippled ovaries imprisoned, it may be, in lymph deposits, fixed and occluded tubes, permanently damaged endometrium, acute uterine flexions and prolapse, and septic blood infection with impaired nutrition and nerve exhaustion; such are, in addition to a fatal termination, some of the results to be guarded against by judicious treatment. Again, many cases of acquired sterility are traceable to abortions or miscarriages, and extrauterine pregnancy, known now to be of greater frequency than was formerly supposed, may be doubtless, in many instances, traceable to tubes damaged by abortions.

He, then, who bases his treatment upon only the desire to save his patient from death, has not grasped the full indications of his case. To prevent death from hemorrhage and from intense blood-poisoning is certainly his duty, but not his whole duty. His whole duty rests upon the indication of restoring the woman to the conditions of health both locally and generally, so that the various structures, especially of the pelvis, may be uninjured, and the various functions, especially of the sexual and related organs, may be performed with physiological ease and safety. Delivery during the early weeks of pregnancy is attended with a minimum of risk to life, yet subinvolution, often with endometritis and endosalpingitis, frequently follows such an abortion. About the third month begins the actual danger of death from hemorrhage and septicæmia, and this danger increases as the period of pregnancy at which delivery occurs advances up to the time when viability of the child begins and the phenomena of labor at full time more or less pertain. It should be borne in mind that crippling of the functional sexual capacity of the woman is liable to result whatever the period of non-viable delivery.

The treatment of such a delivery is divisible into the expectant and the active plans. The chief difference between these two plans consists, on the one hand, in securing artificially the emptying of the uterus if nature does not effect this promptly; while, on the other hand, such interference is strictly avoided, at least until symptoms determine danger to the patient. During the early weeks, there not arising practically any danger of loss of life, the plan of non-interference is not departed from by its advocates, and is adopted by not a few of those who resort to the more active treatment in the more advanced deliveries.

In early abortions, say prior to the end of the second month, in

addition to rest for eight or ten days in bed or on the lounge, I have practised during late years antiseptic cleansing of the uterine cavity by means of one injection of a corrosive sublimate solution 1 to 4000; after the escape of the ovum I resort to only one injection and always use a return-tube catheter. I have not thought it necessary to resort to the curette prior to the second month, except when by reason of instrumental interference septic infection is especially liable. During the third month, in addition to the antiseptic intrauterine injection, I use a smooth wire curette, preferably immediately after the escape of the ovum, resorting at the same time to the injection. It is during and after the third month that dangerous hemorrhage may arise. If the patient is confined to the recumbent posture danger from this source, however, rarely occurs. If the bleeding appears, however, before the os is sufficiently dilated to admit of emptying the uterus, I tampon both the cervical canal and the upper vagina. For this purpose I prefer strips of baked cloth, because of the ease of introduction and of removal. Antiseptic syringing is resorted to both before the introduction and after the removal of the tampons. The tampon should not be resorted to as a routine treatment. Hemorrhage that is not controlled by the postural treatment and by cold applications, is the only indication for the tampon. After the os is dilated, the best way of treating the hemorrhage is to empty the uterus and to inject into its cavity hot antiseptic water. In the absence of serious hemorrhage, the rule to avoid rupturing the membranes should be rigidly adhered to, inasmuch as an unbroken ovum tends to prevent or to check hemorrhage, and if the ovum is delivered with unbroken membranes, the placenta is most likely to be expelled in an intact condition. If the membranes have been broken, the embryo or foetus usually escapes from the uterus, while the placenta and membranes remain within the uterus and are probably adherent to it. Suppose the embryo or foetus has escaped, then, as is well known, the placenta and membranes will usually be expelled within twenty-four hours, yet in a large proportion of cases they will remain within the uterus for days, weeks, or months. Does the continuance of the placenta within the uterus for even a few days at a non-viable period of pregnancy bring dangers to the patient? The answer to this must be absolutely in the affirmative. Such danger is a very considerable one to life from both hemorrhage and septic infection. And even should the patient escape with her life, I do not believe that anyone ever escapes without serious injury to the childbearing apparatus. Under such circumstances arise conditions which are likely to produce sterility or to determine sub-

sequent abortions. Such patients suffer, it may be throughout their sexually active lives, with disturbances of the functions of the vagina, uterus, tubes, ovaries, bladder, and rectum with varying degrees of other local and constitutional suffering.

Septic changes of the products of conception under such favorable conditions of warmth, moisture, and contact of atmospheric air are developed so rapidly that, although absorption is probably not so rapid as at or near the full period of gestation, no one can say how soon the process of septic infection begins. The incipency of such blood-poisoning is not heralded by any definite symptom. Even the rise of temperature, as shown by the thermometer, is not fully reliable unless observed every hour or two, and to wait until hemorrhage, or a rapid pulse, or a chill, or decidedly high temperature supervenes, will prove in not a few instances to be waiting until a fatal result is inevitable. Or should the uterus have emptied itself within a few days without evidence of danger of death, still in the great majority of such cases I believe that grave and, it may be, permanent local damage will have resulted. We are told to let the placenta remain until there are evidences of danger and then to remove it. Wherein is benefit to be derived from such a rule of practice? Is it not wiser to take due precautions against fire than passively to await the development of flames within the building? An abortion or a miscarriage is a non-physiological accident; it is unnatural and pathological. There is no weight, then, in the argument that artificial removal of the placenta is unnatural and unphysiological and hence should not be resorted to. Its retention brings to the woman her greatest danger both as to life and to future usefulness. A uterus promptly and rightly emptied, uninjured by traumatism and rendered aseptic, becomes a source of comparatively little, if any, danger.

As in labor after the child has become viable, so in abortions or miscarriages ergot is of great service after the uterus is empty. It then encourages involution, checks excessive lochial flow, expels clots, and lessens septic absorption. Before the uterus is empty this drug is seldom of more than limited value, and often is productive of actual harm.

When the hemorrhage is considerable and the ovum is intact, its administration will aid in controlling the loss of blood, but even here the tampon is usually sufficient. I believe that I have repeatedly seen the use of ergot retard the completion of the delivery by determining an undilatable condition of the cervix. Such belief has been strengthened by finding that under such circumstances the adminis-

tration of an opiate hastens the delivery by relaxing a cervix that has been rendered rigid by ergot. In incomplete miscarriage there is nothing more uncertain than the action of ergot. After its use the uterus may not empty itself for days or weeks, while the cervix closes so as not only to prevent the escape of the placenta, but also to prevent easy artificial extraction.

If you decide upon emptying the uterus, what is the best method of doing so? Prior to the third month the small size of the cervical canal renders the introduction of the finger difficult, and the curette is here sufficiently efficient, either before or after the escape of the ovum. The thickened decidua may then be readily removed with this instrument.

After the third month we have chiefly the placenta to deal with, and here the introduced finger is safer, more efficient, and more reliable than any curette. The finger more thoroughly and more certainly removes all the products of conception, and tells the presence or absence of such complications as polypi, fibromata, etc. When reliance is placed solely on the curette, the uterus may be supposed empty when it is not; fragments of placenta and of membrane, or even the entire placenta may be left, with extreme risk to the patient.

If one is present at the time of the escape of the embryo, and the placenta remains, he should at once, while the os is dilated, introduce his finger into the uterus, and while depressing and steadying the uterus with the other hand over the abdominal wall, dissect off *en masse* and completely the secundines and remove them. To effect this it may be necessary to give an anæsthetic. After emptying the uterus it should be at once syringed with a hot corrosive sublimate solution.

There will be, in all probability, no indication for a repetition of the intrauterine injection, though daily intravaginal antiseptic syringing for eight or ten days has been my practice. If the case is not seen until several hours have elapsed and the placenta is still within the uterus, and ergot has not been administered, the os will be sufficiently dilatable to admit of an immediate resort to the prompt treatment. If at that time the cervix has already contracted because of ergot, the suspension of the ergot and the administration of an opiate, with non-interference for a few hours, will secure a dilatation of the os to such an extent as to permit the emptying of the uterus with the finger. If a number of days or weeks, or months, have elapsed and the symptoms indicate an incomplete emptying of the uterus, and the cervical canal is closely contracted, it will be better to dilate either

with laminaria tents or with graduated bougies and to introduce the finger, than to rely upon any form of curette. After grave septic poisoning has occurred, a cervical canal that has been previously contracted undergoes a relaxation, and the placenta becomes detached or is so loosely adherent that its removal with the finger is usually a very simple procedure, and is, according to even the expectant practitioner, urgently demanded; but, immediately following removal of the placenta under such circumstances, evidences of more intense poisoning are frequently observed, and in many such cases a fatal termination eventuates.

There is but one form of curette that should ever be used for the removal of any of the products of conception. The perfectly dull wire curette is the only safe one. Every form of the sharp-edged instrument should be absolutely avoided. Simon's scoop is a dangerous instrument in the hands of the most careful. Much of the opposition to the curette is based upon the use of that or other cutting instrument. Even with the dull wire due caution must be used not to injure the uterus. A softened womb may be penetrated by even a dull instrument. My preference for the finger over the curette is based, however, rather upon the uncertainty as to the efficient working of the dull curette than upon its dangers. It would seem scarcely necessary to caution any one not to mistake the somewhat elevated and roughened placental site for portions of the placenta itself; but in one instance I saw such a mistake made by an inexperienced gentleman who made active efforts with Simon's scoop until the uterine tissue was extensively gouged into by that dangerous instrument. Experienced men have left large masses of placenta—in fact, the foetus and its placenta both—in *utero* after the cavity has been curetted. The possibility of double pregnancy with separate placentæ must not be lost sight of. I have seen an instance in which the physician removed with his finger under anæsthesia one foetus with its secundines, and left within the uterus unrecognized a second foetus and its placenta until uterine contraction secured their expulsion.

I have not referred to the various complications of non-viable deliveries. They are numerous and may call for special additional measures, but the management of the delivery rests upon no peculiar principle. Criminal abortion brings with it greater dangers, but usually the management does not differ materially from that of the non-criminal delivery. In the criminal variety septic infection may occur before the abortion or miscarriage has begun, and the expectant plan of treatment is attended with the greatest dangers. An injudicious

introduction of the sound may engender a septic inflammation of the endometrium and determine a fatal result before any part of the ovum is expelled. Under such circumstances non-interference contributes to death.

In inevitable abortion I have repeatedly emptied the uterus by compressing the body between two or three fingers within the vagina and in front of the uterus, and the other hand over the abdomen. I have also secured, in a few instances, a prompt ending of an incomplete abortion or miscarriage by the injection of hot water into the uterine cavity, of course securing its ready outflow. The hot injection awakens active corporeal contractions with cervical relaxation, and, if the fluid is antiseptic, diminishes the danger of infection.

DISCUSSION.

DR. WILLIAM GOODELL: I take exception to but one point in this admirable study, and that is, to the use of the dull curette. I have given up the use of the dull curette for several reasons. There is great danger of wounding the endometrium in its soft, thickened, and vulnerable state. Then there is this very danger, the speaker has mentioned, of mistaking the placental site for tissue that should be removed, and the further danger, which he also admits, of perforation. I am sure that I once penetrated the wall of the uterus with a sound, and without using any force—though, fortunately, I escaped an evil result. There is danger of wounding that portion of the uterine wall which is not at all implicated, if I may so express it; and especially, two or three days after the abortion, would this cause a liability to the creation of a fresh raw surface upon perfectly healthy tissue, with additional danger of infection.

I use two styles of forceps, one a small catch-forceps, which will seize anything that projects, or, still better, a small fenestrated polypus forceps, which can grasp any projecting mass, however small, and that only.

DR. REGAR: How can we tell that the uterus is completely cleaned out? The finger cannot always determine with certainty. How long are we to keep up examinations and attempts at cleansing?

DR. J. B. WALKER: May we not answer the preceding speaker by saying that as long as the os is patulous the uterus contains something that needs removal: after removal contraction will occur? That has been my experience in several cases. I would ask Dr. Parish whether the rule holds good in all cases?

DR. H. A. SLOCUM: I rather fear to follow the advice given to permit the ovum to escape entire. I remember two cases which fortunately terminated favorably, but which gave me much anxiety, in which the escape of the ovum

entire was followed by alarming hemorrhage. One of these was in a well-developed florid woman who had a history of repeated miscarriages. When I was summoned she was bleeding slightly, and the labor pains were strong and constant. With my finger in the vagina I waited for the ovum to be expelled entire. It came with a gush of blood that blanched the ruddy face of the patient and left her pulseless. I was compelled to remove the pillows, elevate the foot of the bed, and with finger and hand endeavor to excite uterine contractions, after which, with hot water injections and other appropriate measures, the bleeding was controlled.

When a uterus is distended with its contents, and the placenta leaves its site, and the large mass is suddenly expelled, it seems to me that the sinuses will be left wide open, and the contractile vigor of the uterus will not suffice to close them.

I agree with the advice to remove the placenta as soon as possible. I remember a case, however, in the practice of a distinguished practitioner, in which, for what reason I do not know, it was left for six weeks free in the cavity, becoming hard and leathery, and was then removed under anaesthesia. My only connection with the case was to give ether, so that I know nothing further of the circumstances than that the placenta remained for six weeks without giving rise to any bad symptoms.

DR. W. E. ASHTON: I would take exception to the speaker's low estimate of the value of ergot. While I will agree that it is contra-indicated, except with a tampon, yet if the tampon be introduced and ergot then administered, the effect will be much more prompt and sure, and the presence of the tampon will prevent anything like hour-glass contraction. After a complete abortion I should consider intra-uterine antiseptic irrigation uncalled for, and rather dangerous as tending to introduce air, and, therefore, germs, into a uterus which is otherwise in an aseptic condition.

DR. PARISH: In reference to the use of the dull wire curette, Dr. Goodell could not have heard my remarks, or I must have failed to express myself clearly. I do not use it except at one stage, that is the third month, never after the placenta has been formed. I prefer the finger for many reasons, as I stated. Even with the dull instrument there is some risk of injury, and the method is unreliable. Dr. Goodell and I accord perfectly, after the third month. Before the differentiation of the placenta, however, the smooth wire curette will detach and remove the deciduous membrane with no danger.

I have used forceps, though not exactly the same form as spoken of, but the objection is that we cannot be sure with any form of instrument whatever that the uterus is empty. The finger alone tells us that. It is not only a therapeutic but a diagnostic appliance. It must be very rare for the uterus to possess the power to expel the ovum unaided, and then fail to take care of itself. There must be some special morbid condition to which the hemorrhage is due. In the case narrated by Dr. Slocum, with its history of frequent miscarriages, I should have suspected a polypus.

I do combine the use of ergot with the tampon, should the latter be insufficient when the ovum is intact, especially if the ovum is intact to give a smooth mass on which to contract. Antiseptic injections are indicated after such a pathological process as a miscarriage. I doubt if the uterine cavity

usually closes air-tight after such a process. Not infrequently there is a separation of the uterine from the fetal layer of the placenta with adhesion of the uterine portion. This adherent maternal layer is liable to give rise to septic inflammation and general infection.

The patulous condition of the cervix is, to some extent, an evidence that the uterus is not empty, but the reverse does not hold good. It would be unsafe to conclude that everything had been expelled because the os was found to be contracted.

REPORT OF A CASE OF OVARIOTOMY.

By J. H. W. CHESTNUT, M.D.

[Read June 13, 1888.]

UNDER the benign influence of antiseptics, the recent progress of abdominal surgery has been so remarkable and the number of ovariectomies has been so considerable, that this case is reported not because of special characteristics, but rather as a further demonstration or exemplification that the operation in question has been removed from the border-land of doubt and has become one of those which the general practitioner, who does surgical work, may, under proper circumstances, essay to perform.

On November 10, 1887, Mrs. J., *æt.* thirty-seven years, a small woman weighing one hundred pounds, the mother of two children, the younger six years old, consulted me in reference to an abdominal enlargement which occasioned her uneasiness. Her periodical sickness was regular but scanty; she had nausea and was much distressed by frequent and at times ineffectual efforts at micturition.

A careful examination of her abdomen by palpation revealed a tumor about the size of a large apple which inclined from the left to the middle and seemed to be solid. A vaginal examination gave a movable womb, a firm os and conjoined manipulation assuring me that the case was not one of pregnancy; the uterine sound was used and gave a measurement of 2.7.

Under the impression that the nausea and irritation of the bladder were due to pressure, a supporting bandage was ordered and small doses of thymol (*gr.* $\frac{1}{4}$ th) and *ext. belladonnæ* (*gr.* $\frac{1}{10}$ th) were prescribed. On November 20th I saw the case again; the general abdominal swelling had materially increased, the special tumor was larger; but the nausea and the difficulty of urination were less. After a second examination it seemed clear that the tumor was ovarian, but in the belief that under the circumstances operative measures were not for the time demanded, it was determined to try the efficacy of medicinal treatment as recommended by Courty, who cites two well-marked cases of recovery. Chloride of gold and sodium, iron in various forms, iodide of sodium, iodide of potassium, and arsenic, were given internally; to these were added inunctions of iodide of lead, iodide of potash, belladonna, and graduated pressure by rubber bandages. These efforts were suc-

cessively tried without success. In fact, I am disposed to believe that the methods pursued were rather injurious generally than otherwise.

The tumor enlarged rapidly and the general health of the patient depreciated. On Dec. 6th she had a violent chill ushering in a peritonitis of grave severity accompanied by great dyspnoea. The peritonitis finally yielded to a large blister 8 x 8 inches and the internal administration of calomel and opium. After the subsidence of the acute inflammatory symptoms, a persistent nausea with occasional attacks of diarrhoea protracted the convalescence. She was able to go about the house by the middle of January, 1888; but was rarely without dragging abdominal pains, was unable to sleep well, had frequent attacks of dyspnoea, and in consequence of impaired digestion as well as because of the inroads made on her vitality by the growing cyst, her emaciation became marked. On several occasions a suppression of urine due to pressure on the ureters or on the kidneys was a serious complication; dry cups to the lumbar region and along the groin, followed by hot mush poultices, were effectual in relieving the condition. She declined an operation.

On March 3d a second attack of peritonitis threatened to terminate the case; it was treated by anointing the now large abdomen with oleate of mercury and extract of belladonna, one drachm of the latter to one ounce of the former, and by full doses of opium by the stomach. The patient was able to leave her bed in ten days and agreed to an operation for removal at the earliest practicable time. The preparatory treatment consisted in the administration of syrup of the iodide of iron, the use of Murdock's liquid food, meat juice, milk, and milk punch, in addition to such table food as she could take. Her digestion was assisted by pepsin in acid solution. The whole body was well rubbed once daily at bedtime with a mixture of sweet oil and whiskey, and her belly was anointed once a day with belladonna ointment, which, at least, was a source of great comfort. The bowels, which had become torpid, were regulated by drachm doses of extr. cascara sagrada, supplemented by an occasional enema. The sluggish kidneys were stimulated by dry cupping and by small doses of digitalis, which also exerted a favorable influence on the shortness of breath.

The determination of a limit of necessary endurance may have by some psychological influence stimulated the vitality and so seconded the nursing and feeding that the general condition materially improved without cessation in the progress of the cyst or favorable change as to emaciation. April 11th was the time fixed for the removal of the cyst; the abdomen was then larger than it should have been in a pregnancy at full term; fluctuation could be elicited, but was not so marked as the distended abdomen would have suggested; the face, neck, chest, and limbs were very thin; and the skin, notwithstanding its sedulous care, was somewhat harsh. The direct preparations were simple. On the 9th her room was cleaned and lime-washed, and all furniture save the single bed removed. A solution of carbolic acid was kept simmering on the stove. On the morning of the 10th a glass of hot lemonade with a teaspoonful of heavy magnesia was given, fasting, and in the afternoon she had a dose of castor oil, followed, after several free evacuations, by one grain of opium. On the morning of the 11th she was well washed, had a bowl of boiled milk for her breakfast, and at eleven o'clock a tablespoonful of brandy and thirty drops of tincture of opium.

The antiseptic measures were a solution of bichloride of mercury 1 to 2000, used to wash the abdomen; two pounds of a 95 per cent. solution of pure carbolic acid, from which dilutions were made 1 to 30 for instruments and sponges, and 1 to 40 for use within the abdominal cavity; a solution of thymol 1 to 1000 used to spray the abdomen before closing; and some finely powdered iodoform with a good supply of salicylated cotton.

The kitchen table and a backless chair completed the arrangements. After the patient was under the influence of the ether, my friends Dr. A. H. Hulshizer, Dr. W. H. Hech, and Dr. William C. McFetridge, entered the room. Dr. Hech assumed charge of the ether, Dr. Hulshizer assisted me throughout the operation, and Dr. McFetridge took charge of the antiseptic solutions, gave the hypodermic injections hereafter mentioned, and had the care of hot bottles, etc.

The abdomen was well washed with the bichloride solution. After making the usual incision of about three inches through the abdominal walls, opening the peritoneum, and pushing aside a fold of omentum, the wall of the cyst was seen. As was expected, a sound introduced between the cyst wall and the peritoneum revealed extensive adhesions, and the incision was at once enlarged to about six inches. Such of the adhesions as would not yield to the finger (and they were many) were tied with carbolized catgut ligatures and cut close to the cyst. Even after all adhesions within reach had been severed the tumor seemed barely movable. It was evident that the walls were thick and fleshy in parts, and that the contents of some of the divisions were at least semi-solid. A trocar and canula with angular attachment for gum hose was plunged into the most prominent and apparently the largest division low down. After approximating the wall of the cyst to the canula as closely as possible, about a bucketful of thick brown fluid was run off; when the liquid ceased to flow, the sac was pulled out of the cavity as far as possible, a ligature thrown around the opening and tied. The evacuation of and traction upon this cyst enabled me to reach deeper adhesions which were treated as before, and then a second cyst or cystic division was emptied by the canula. I was then able by persistent manipulation and the severing of other adhesions to evert the mass, the pedicle was pierced by a small flat needle carrying a double carbolized silk thread; each half was tied separately and the ends of the thread brought around the body of the pedicle and tied again. The pedicle was cut about three-quarters of an inch from the ligature; it was well washed, dried, and dropped into its bed.

There remained to see that no oozing occurred, to clean and to close the abdominal cavity. There was almost no oozing. The cavity was carefully sponged out, and an almost hot spray of the thymol solution was thrown in, the folds of omentum which had been wrapped in a hot napkin (occasionally changed) were replaced, and the wound was closed by eight silver sutures, each enclosing the peritoneum. Over the line of incision a moist piece of lint, spread with iodoform, was placed and held in place by three broad strips of adhesive plaster, then a pad of salicylated cotton, and over all a bandage of double flannel. The bladder was emptied and the patient put in bed.

During the operation a hypodermic injection of sulphate of atropia in a drachm of whiskey was given once when the respiration became alarmingly

feeble, and another of a drachm of whiskey alone was given at the conclusion of the operation.

I may note a little misadventure that afterward proved troublesome. One of the hot bottles placed at the patient's side to maintain heat must have slipped for a moment under her buttocks, and been the initial irritation of a bedsore.

The subsequent nausea was a little obstinate; it continued during the first twenty-four hours, and yielded either to the returning vitality of the stomach or to the external application of an ice-bag and the internal administration of one-quarter of a grain of cocaine given every three hours for four doses. The nurse was instructed in the use of the catheter, and used it for the first eight days. The diet was restricted for three days to beef-juice with brandy, and oatmeal gruel, with apollinaris water to drink. After the fourth day, there being no nausea and no fever (the temperature was never above 100.5°), a gradual return to a generous diet was permitted. The bowels were moved on the sixth day by enema, after a dose of castor oil.

About this time complaint was made of the bedsore. I found it on the right buttock with an ugly looking slough. The slough was cut out, the cavity washed with carbolic acid solution, and filled with finely powdered charcoal, covered with adhesive plaster. It was well washed out daily with a syringe, and refilled until it healed by granulation. This was the only untoward symptom or circumstance following the operation. The bowels assumed a regular action, and the bladder behaved better than it had done for months. With a good appetite satisfied, the continuance of the sweet oil and whiskey bath daily, and the tonic influence of hope, assured every day added strength to the patient. Four weeks after the operation she went to Salem, N. J., to recuperate further, and I am advised that she is quite well.

In looking over the case, it may be questioned why I did not tap for relief. The temptation to do so was great, but independently of the danger of the procedure, which might have been considerable, it could only defer what should be the termination of the case. Tapping could not even promise with certainty considerable relief, for the fluctuation was not very marked; it might strengthen the patient's disinclination to have the cyst removed, and it was at variance with my opposition to half-way measures after a definite conclusion had been reached. I did not weigh the mass and contents, but I was assured by the patient's husband that the fluid and solid material weighed fifty-seven pounds. After removal the smaller divisions were opened and found to contain a semi-solid brown substance, which could be pressed out. The cyst walls were thick and fleshy in parts, and thin and softened in other parts. My friends agreed with me that the cyst would, at no distant day, have ruptured.

Of such a work it may be said, that the gravity of possible consequences, the traditions of the past, and the preceding grave symptoms

have attached to it a formidable name, and an importance somewhat at variance with the simplicity of its performance and the proportion of good results. The busy practitioner has daily on his lists cases infinitely more obscure as to character, more difficult as to treatment, and less hopeful as to results.

DISCUSSION.

DR. G. G. DAVIS: I wish to take exception to the preliminary remarks of the reader, that his case demonstrates that it is right for the general practitioner to undertake this class of operations. I hold that no one should open the abdomen unless he is prepared for whatever may be found, and we know that the most experienced operators tell us that they cannot be positive, in advance of incision, of the conditions that they will meet with. It may be as here, a very simple matter, or it may be a very serious one. Only those who have had a certain amount of preliminary training and are prepared to follow up the operation by the most radical procedures if necessary, should do these operations. One case cannot be considered as establishing a principle.

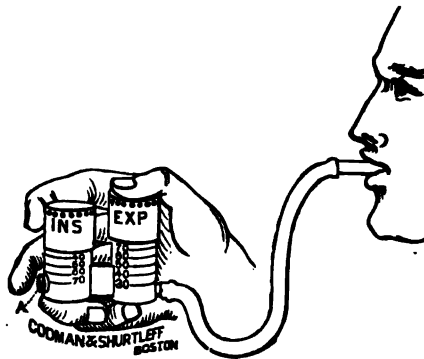
DR. GOODELL: There is one point I wish to call attention to in connection with this graphically detailed picture of an ovariectomy, and that is the danger of having sloughs produced by hot water, to which the author has alluded. In a case of oöphorectomy for fibroma, of which I was cognizant, the flannel in some way became probably displaced from the hot bottles and two severe burns of the heels were caused, the recovery from which was more tedious than from the operation. One other little point. It is a mistake to introduce the trocar at the lower angle of the wound; for as the cyst empties, it collapses and may slip off from the trocar. The rule is to introduce it at the highest angle of the wound, so that it may have room to travel down with the collapsing cyst.

DR. CHESTNUT: The case was not presented as a single one to establish a rule, but as an additional illustration to the many on record, that under anti-septic precautions and under proper circumstances the general practitioner, who has confidence enough to do surgery at all, may also do an operation like the one reported.

PNEUMATIC RESISTANCE VALVES.

[Exhibited June 27, 1888.]

DR. SOLOMON SOLIS COHEN exhibited the Pneumatic Resistance Valves. This instrument, which the author has used for a year with great satisfaction, is designed to give the physiological effects of inhalation of rarefied air, or exhalation into compressed air, by means of valves interposed as a resistance in the current of respiration. The valves are controlled by springs, and the tension of the springs may be regulated by screwing up and down the covers



of the little cylinders in which the valves are enclosed. These cylinders, of which there are two, one for inspiration and one for expiration, measure one inch in diameter, and about two inches in height. They are connected beneath the valves by a metallic base, hollow to permit passage of air to the lungs by way of a rubber tube and mouthpiece, attached to a little nipple posteriorly. This base is perforated anteriorly, and the cylinder caps are perforated superiorly. If the anterior perforation be occluded, air has to pass through the cylinders and overcome the resistance of the valves. But if the anterior perforation be left open, the air passes beneath the valves. Thus, either inspiration alone, or expiration alone, or both, may be affected; according to whether the finger be placed over the anterior perforation, or not. The air in passing through the cylinders is resisted by the valves, according to the tension of the springs, which may be adjusted by a scale on the side, to any desired fraction of atmospheric pressure, from one-thirtieth to one-seventieth of an atmosphere. In inspiration, the effect is equal to inhaling rarefied air; as before the atmospheric air can pass the valve, the chest must be expanded

sufficiently to rarefy the air within the lungs (all air, indeed, between the pulmonary alveoli and the valve) to a degree equal to the tension of the spring; and this rarefaction must be maintained during the whole act of inspiration. In expiration, the air within the lungs must be compressed sufficiently to overcome the resistance of the expiratory valve, before it can pass that valve into the atmosphere. The effect is the same as exhaling into compressed air. In both cases, increased muscular effort on the part of the patient is necessary, and we have regulated pulmonary gymnastics. The physiological and therapeutical effects are those of *inhalation of rarefied air*, or *exhalation into compressed air*, as in any other form of apparatus. The advantages of this particular instrument are lightness, portability (it can be carried in the pocket), simplicity, and cheapness. It is made by Messrs. Codman & Shurtleff, of Boston, and costs only five dollars.

A CONTRIBUTION TO THE STUDY OF BONE REPAIR.

By JOHN S. MILLER, M.D.

[Read June 27, 1888.]

THE recent observations of Macewen¹ have done much to stimulate the study of bone repair, and have thrown not a little light upon the function of the medullary cells in osteogenesis.

The resort to mechanical irritation of the medullary tissues as a means of accelerating bone repair, is an old procedure. Nancrede² claims a priority in this for America. As far back as 1793, Eve³ relates that the lay surgeons of the frontier were wont to make multiple perforations of the external table of the skull where necrosis had followed the Indian mutilation of scalping. And twenty years ago Agnew⁴ resorted to the same procedure in a case of injury to the head; a fatal termination of the case, however, by encephalic complication, rendered the experiment incomplete. Reports of success by this procedure have been recently multiplied to an extent which will excuse us from repeating them in detail.

That, furthermore, medullary proliferation is not only an element in osteogenesis, but is of itself sufficient to that end without periosteal coöperation, is evidenced by the case of Macewen,⁴ in which a considerable restoration of the humerus was secured "by bone-transplantation," after a suppurative inflammation had destroyed both the shaft and its periosteum. The date of this observation is 1878.

The patient was a boy, two years of age. A suppurative periostitis of the right humerus of nine weeks' duration had resulted in total necrosis of the entire diaphysis, and this latter had been removed, leaving a tube of granulation material lining the periosteum. This tube had been kept patent by suitable dressing, until the whole space had become filled with granulation tissue, and had finally become a mass of cicatricial tissue. No bone had

¹ *Annals of Surgery*, vol. vi. pp. 289 et seq., 389 et seq.

² *Internat. Encycl. of Surg.*, by Ashhurst, vol. v. p. 8.

³ *Remarkable Cases of Surgery*, p. 35. Philadelphia, 1857.

⁴ *Loc. cit.*, p. 301.

grown from this periosteum, except in a small part next the proximal epiphyses, where at the outset the periosteum had been found covered with plaques of adherent osseous tissue. In the remainder there had been no osseous deposit, the result being a flail-like arm, which the patient found so useless that the parents desired its removal.

- Macewen determined, however, upon another procedure. An incision was made into the upper third of the arm, exposing the head of the bone, to which was found attached a spike-like process of cartilage. This was removed, leaving as remains of the diaphysis a portion of bone one and three-fourths inches in length. From this point a sulcus about two inches in length was made in a downward direction between the muscles. The former presence of bone was nowhere indicated, and there was no vestige of periosteum, and the sole guide as to the correct position into which the transplant was placed was an anatomical one. Two wedges of bone were then removed from the tibia of a patient aged six years, with anterior curves. The face of the osseous wedges consisted of the anterior portion of the tibia, along with its periosteum, the wedges gradually tapering toward the posterior portion of the tibia. After removal they were cut into minute fragments with the chisel, quite irrespective of the periosteum. The bulk of the fragments had no periosteum adhering to them, they having been taken from the interior of the bone. They were then deposited into the muscular sulcus of the boy's arm, and the tissues drawn over them, and carefully adjusted. The wound healed without pus production. Two months after, a portion of bone an inch in length and three-quarters of an inch in thickness was found firmly attached to the upper fragment of the humerus.

Two other wedges of bone, larger in size, were similarly dealt with, and inserted two months subsequently to the first graft, and a third couple were placed in position five months after the first. These filled up the gap in the arm to the extent of four and one-quarter inches. The arm then measured six inches in length.

Soon the utility of the arm was greatly restored. Seven years afterward he was seen and examined. The shaft of the humerus was found to have increased in length by one and three-quarters inches, being now seven and three-quarters; and it had increased in circumference to a marked extent, and assumed a somewhat irregular shape. The length of the sound arm had, however, considerably outstripped the length of the transplanted humerus. He could use the arm for many purposes, taking his food, adjusting his clothes, and many games.

Whether the introduction of proliferating medullary cells into ordinary connective tissue granulations may convert the whole into osseous tissue, or that a few osteoblasts will, so to speak, leaven the whole mass, is a question involving grave doubt, but the affirmative would seem to receive some support from the case which Nancrede¹ relates in 1883. An extensive laceration had caused denudation and necrosis of the ulna in two-thirds of its extent. The process of repair had been delayed;

¹ Transactions of the Philadelphia Academy of Surgery, 1888.

he drilled numerous holes through the sequestrum into the medullary canal, and, to quote his own words, "in a few days granulations sprang up from the ulna and fused with the granulations of the soft parts, and, in course of time, the fragment was separated."

That the procedure in this case had the effect of stimulating osteogenesis from within, we can readily believe; but concerning the fusion with granulation tissue without, a more accurate observation than is recorded by Nancrede is desired; although by analogy we might conceive it possible, inasmuch as repair within the bone is by ossification of an embryonic tissue derived from the connective tissue around the bloodvessels of the medullary spaces. A similar case is reported by Macewen,¹ in which granulations appeared upon a surface of bone completely denuded of its periosteum, and gradually spread until they became united with the granulation tissue at the periphery of the wound. Macewen, however, infers from this observation that

"The periosteum covering a bone may be completely destroyed or permanently removed, yet the denuded bone may not only retain its vitality, but may throw out cells which will cover it and form a new periosteum."

These cases would seem to confirm Macewen's dictum that the periosteum has no part whatever in the regeneration of bone. But the first case I shall present to your notice this evening demands a different hypothesis for its explanation.

The patient, D. M., aged fourteen years, suffered from an osteomyelitis of the right tibia, resulting in total necrosis of its diaphysis. A complete involucrum had formed around the sequestrum and afforded an unsteady support to the body weight. It was covered with the thickened periosteum. A number of fragments had been removed from time to time, and the parents had refused to entertain for him the proposal of amputation. The case, however, when it came into my hands, had become from septic infection so desperate that I was compelled to do something radical at once.

Exposing the shaft, or rather the involucrum, through its whole length, I made with trephine and saw a fenestrum large enough to permit the removal of the remaining sequestra, and cleared out the whole canal. Both epiphyses were found carious upon their exposed surfaces, and were scraped to the limit of safety. In a few days a superficial necrosis took place upon the inner surface of the tube.

Demarcation was, however, promptly effected by the free use of aluminium acetate²—that sheet-anchor in all sloughing wounds—and a fine layer of fine granulations became the field for any osteogenesis which we might hope to witness. During the long process of repair with the carious epiphysis as a

¹ Loc. cit., p. 293.

² R.—Pot. et alum. sulph., 1 part; plumb. subacet., 5 parts; aquæ bull., 100 parts. M. Filtra.

never-failing source of bacterial supply, it was no trifling task to keep this extensive opening dry and sterilized. Furthermore, neither the patient, the household, nor the neighborhood could endure frequent dressings without great nervous prostration.

The requirements of the case were successfully met by a mixture of iodoform and starch, in proportions which varied with the changing conditions. The cavity of the wound was filled with this dry powder, and to the whole was applied a closed dressing of gutta-percha tissue. The purpose of the starch was to absorb the excess of moisture incident to a closed dressing as well as to dilute the iodoform. As soon as the powder became saturated, it was removed by a stream of sterilized water, and the wound was filled and closed as before. The periods of dressing were gradually increased from three to ten days. I mention these details, because without them, or similar ones, we can wait in vain for the desired repair. In process of time the hollow of the involucrum became completely filled with granulation tissue, which continued to extend until it fused with the granulations from the soft parts, and, finally, the whole became covered with a new epithelium, which had gradually spread from the edges of the wound. The tissues became now denser, and offered more and more support to the body weight until, as you see, he has acquired a very useful limb, and can walk without discomfort.

We must, therefore, infer that a metamorphosis into bone has taken place, and as the original diaphysis was gone with its medullary structure, we can find no osteogenic agent in the result other than the periosteum.

We must draw a similar conclusion from the recent case reported by Ceci :

The patient, a young man, developed an acute osteomyelitis of the left scapula five days after circumcision for inflamed phimosis. One month later, Ceci¹ extirpated the bone, making the usual L-flap. The periosteum was left intact as far as possible, and the arm was preserved. The patient recovered rapidly, and there was a subsequent regeneration of the bone.

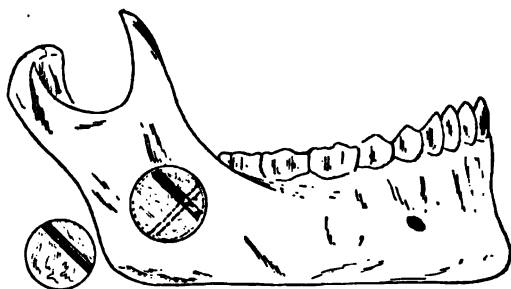
The only possible explanation of this result is by the hypothesis of periosteal agency or coöperation.

The second case which I present is in confirmation of Macewen's proposition that

"A portion of bone which has its continuity severed on all sides, and has had all its periosteum removed, is capable of living and growing."

This is in contradiction to our inference in the case of the tibia, and can be reconciled only by the assumption that the discovered laws of osteogenesis are of a lower order, subject to some general law of which we are as yet ignorant. But to the case.

¹ *Centralbl. f. Chirurgie*, Dec. 17, 1887.



Mrs. L., aged forty-seven years, had suffered with a neuralgia of the maxillary inferior, for the relief of which all medical means had been exhausted in vain, and which, therefore, left to my option only the *dernier ressort* of neurotomy. The mode of operating was the usual one. The ramus was trephined near the angle of the jaw, the canal was exposed, and about two inches of the nerve trunk were drawn out and exsected. The button was, however, returned after having been sterilized in a 1 to 1000 solution of corrosive sublimate, but it was not returned to its old position. With a view of imposing a barrier to the reproduction of the nerve, it was so rotated around its vertical axis that the groove upon its lower surface stood at right angles to the axis of the canal. Not only did the wound close by first intention, but the button grew solidly in its position. Now, the curious thing in the case is that, before trephining, I had carefully removed the periosteum, so that the latter can claim no part in the subsequent bone repair. After seven months there has been no return of the disease.

DISCUSSION.

DR. JOHN B. ROBERTS: It is a curious fact that the medical mind has not appreciated the possibility of bone production, despite the frequent instances that must always have come under notice. I was taught in cases of comminuted fracture, to take out the spicules of bone that were entirely separated from the larger fragments, lest they should necrose and give rise to trouble. Now it is the practice of the best surgeons to leave the spicules, and we find that often they do not die, and that they assist in the process of union and solidification. This experience is in the same line as the facts given by Dr. Miller in connection with his interesting cases. If these spicules of bone can reunite, why not the button removed by trephining? Why is it not good practice to insert, when necessary, a portion of dog bone or chicken bone? as, indeed, has been done. We must not forget, however, the importance of asepsis, and that it is antiseptic surgery that has made these procedures possible.

In a case such as Dr. Miller reports to-night, in which he rotated the button of bone, turning the groove in which the inferior dental nerve had run at right angles to its former direction, I should be inclined to go still further,

and turn it upside down. The bottom of the pit in which it is to be placed, and the periosteal surface of the button being scraped, the ungrooved, freshened surface, formerly external, would then be placed inward, and a bony plug would be interposed between the divided ends of the nerve, probably preventing the reunion and return of pain which so often occur.

The case of tibial resection has been very interesting to me, as I have recently operated upon a similar one; the patient being, however, a woman of about fifty years, so that I cannot hope for as complete a closure of the cavity in the bone as in this growing child, exhibited by Dr. Miller. In that case I removed the whole front of the tibia, going as near the articular cartilages above and below as I dared. The process of repair is like that we see in a tree. We know that if a foreign body is inserted into a wound made in the trunk of a young tree, the process of cell growth will go on about it, and finally it will be completely covered in, and its presence be unsuspected, until, perhaps, the saw strikes it as the tree is being converted into lumber.

Dr. Keen, in his recent case of trephining for brain tumor, returned the button of the skull removed, and the patient was able in a few days to walk around with a perfectly healed and reunited cranium. Then we know what the dentists do in the way of transplantation of teeth, or return of teeth to their original sockets after removal of diseased portions. More remarkable still is the implanting of old, dried teeth into new sockets, bored in jaws from which even the alveolar process had disappeared, and their becoming fixed there.

DR. GEORGE E. STUBBS: In reflecting upon these cases, and similar ones, it occurs to me that perhaps in the numerous resections we have done in army and in civil practice, we have made mistakes. Surgery has advanced immensely since the war-time, and antiseptic surgery has opened new possibilities. Often in my army practice we removed all the bone when there had been a comminution. I should now, with our new light, try to save more of the broken bone, and so shorten the period of recovery.

In regard to operative treatment of neuralgia, I believe that we are entering upon a stage of work that will be much enlarged in the near future. I had a case recently in which neuralgia of the inferior dental nerve had existed for nearly seven years. I removed one and three-fourths inches of bone with the dental engine, took out as much of the nerve as I had access to, and dressed and treated the wound antiseptically. The wound healed by first intention, and as yet there has been no return of pain; so that I consider I have obtained a very good result.

THE CHAIRMAN, DR. NANCREDE: The first question to be answered in a discussion of this kind, is, What constitutes the periosteum? If we mean a fibrous membrane, the inner layer of which consists principally of yellow elastic tissue, then we must agree with Macewen's extreme views, and admit that it has nothing to do with bone repair. But if we study the normal process of bone development, I, at least, must arrive at a different conclusion. The long bones are laid down in cartilage, a temporary structure. How do they ossify? By means of this very periosteum which Macewen treats with such contempt, and which Ollier exalted too highly. There is a third layer of the periosteum in direct contact with the bone, and this layer is composed entirely of those elements which, wherever we see them, we recognize as the agents of

ossification—the osteoblasts. The temporary cartilage is invaded by connective tissue, ingrowths from the periosteum, covered with osteoblasts, and is eaten up by them; and we find it permeated, and finally replaced by a network of fibrous tissue covered with osteoblasts. A certain number always remain beneath the periosteum. A certain number, very small, remain in the Haversian canals, a still larger number in the medulla.

It is clear to me why compact tissue dies: it has so few osteogenetic cells. The medullary tissue lives because it is comparatively rich in osteogenetic elements. Why does bone die when the periosteum is stripped off? Because the resulting inflammation is so severe that the inflammatory tissue strangulated the osteoblasts in the Haversian canals. With antiseptic means we now control the inflammation, and the osteoblasts are not killed, and the bone is saved.

We are very hard, nowadays, on the periosteum. The fibrous layer has nothing to do with bone repair, but its osteoblastic layer is in direct communication through the lining of the Haversian canals with the medulla; it is practically one structure; and thus, if we look at this matter from the standpoint of a correct histology, we find that both views are correct, provided only that we have a distinct understanding what is meant by the word periosteum in each case.

As to Dr. Miller's cases, I cannot quite agree with him as to what formed the bone in the case of total excision of the diaphysis of the tibia. While the shaft was dying, new bone was formed by the deep layer of periosteum, but after that the medullary spaces of the involucrum completed the bone.

I would also take exception to Dr. Roberts's proposition to scrape the button of bone and turn it inside out, in the case of trephining the jaw for neuralgia. By this process he would remove all the osteoblastic cells, and the compact tissue would have a very good chance of dying. One reason for failures in operations about the lower jaw, is that it contains so little true medullary tissue, while, on the contrary, we can replace trephine buttons in the skull and have union, because the skull contains a large amount of such tissue.

I think Dr. Stubbs need not blame himself for his practice in resecting in military surgery. The necessary condition to bone repair is that absence of suppuration afforded by antiseptic methods, and under the conditions present in the operations he speaks of, he did right. And, to-day, he does right in trying to save the bone. In each case he takes the proper course in relation to the circumstances, and that is all any one can do.

The case of Dr. Agnew, referred to in the paper, occurred some twenty odd years ago. I saw the operation. The wound was completely covered by granulations. The fact that a denuded external table did not always necrose, was known to Potts, and to all the older as well as modern surgeons, and if Ollier had not led us astray by grafting, by insisting upon the periosteum being the sole osteogenetic agent, ignoring the fact that in removing it a layer of cells identical with those of the medulla are torn off, I think we would have arrived at a correct practice sooner. But surgeons went wrong by authority of Ollier, as they are now going wrong in the other direction by authority of Macewen.

In regard to the implantation of dead teeth, to which Dr. Roberts refers, the principle is probably the same as in the bony pegs we used to employ for

ununited fractures. They are hollowed out by the granulation tissue, which develops into a fibrous or even osseous tissue, and so holds the tooth in place by these newly formed digitations.

About twelve years ago I exhibited to this Society a case in which I resected four and a half inches of the humerus, and about two and half inches were reproduced from the sawn end. This was without antiseptis. In the case referred to by Dr. Miller, in which I drilled the ulna, I am sure that the bone granulations fused with those of the soft parts for these reasons: the shell of bone when detached was not more than one-fourth the thickness drilled through, while the new bone was nearly as thick as the ulna of the other side, as the cicatrix was not materially depressed. A recent experience in a case of knee-joint excision induces me to recommend that instead of wiring fragments of bone we nail them together, after having previously drilled, or not, according to circumstances, allowing the heads of the nails to project through the skin. We thus save trouble, and avoid damage in the removal.

DR. ROBERTS: Dr. Nancrede misunderstood me in regard to scraping away the cancellated tissue in reversing the plug in the case of trephining the lower jaw. I would scrape only what he calls the fibrous periosteum from the button, and from the bottom of the pit in the jaw I would take away the cancellated structure sufficiently to remove all trace of the nerve canal. The two raw surfaces would be placed together, and, by sinking of the button, would be a solid bony plug, interposed between the nerve ends.

DR. MILLER: I do not see any advantage in reversing the plug over rotating it. The groove being at right angles to the course of the nerve, the part in contact with the nerve is still solid bone, and the groove does not matter at all. In relation to the tibia case, the reason I emphasize the fact that the repair took place from the periosteum, is because there was entire death of the old bone with the involucrum, and the periosteum did not die.

SYPHILIS OF THE LARYNX, TRACHEA, AND BRONCHI.

By J. SOLIS COHEN, M.D.

[Read September 12, 1888.]

SYPHILITIC processes are among the most important morbid processes affecting the larynx and trachea. Not only do they injure the structural integrity of the organs directly, but, by their location in the regions occupied by the origin and course of nerve supply, they lead to denutrition of the tissues generally, and to serious motor impairments of the muscles of the larynx. So varied are the manifestations of syphilis, and so important to the welfare of the patient their timely recognition, that considerable detail is proper in their elucidation. In hardly any other department of living pathology has the laryngoscope been of more signal service than in dispelling obscurities in the conception and comprehension of syphilitic disease of the larynx.

The distinctions between secondary and tertiary syphilis, as manifested in the upper air-passages, are so irregular and uncertain, that many writers prefer the terms recent and tardy. In fact, however, secondary lesions are sometimes tardy and tertiary lesions sometimes precocious. Secondary lesions are sometimes present as the sole manifestation of that period. Sometimes they precede cutaneous manifestations. Most frequently they occur in subjects already affected with what are known as mucous patches in other portions of mucous membrane, or with early cutaneous syphilides. Tertiary lesions sometimes present without any history of secondary lesions.

Pathology.—The earliest and far most frequent manifestations are subacute and diffusely hyperæmic conditions of portions of the mucous membrane, of varied extent and intensity; an erythema with turgescence, but without hypersecretion, occurring within from six to ten weeks after infection. The affected surface exhibits at first the usual rose-color of congestion, but, as stases, infiltrations, and hæmic transu-

dations occur, it becomes more or less livid in patches which present mottled or flaky discolorations. Superficial erosions often ensue. Occasionally, deep-seated ulceration occurs. Sometimes paresis of the muscles of the larynx is produced. The erosions may be due simply to denutrition of epithelium from mere pressure by infiltrations; or to disintegration of a characteristic proliferative lesion known as the papule or mucous patch, by some termed broad condyloma, a product, according to Virchow, of the same histological character as the indurated chancre and the various gummous formations, namely, an infiltration of tissue with nucleated embryonic cells. These papules are characteristic, but by no means frequent syphilitic products in the larynx; and are so infrequent in the trachea that their occurrence there is denied by authorities the very highest. They are multiple recurrent lesions, almost invariably associated with mucous patches on other mucous membranes; usually lasting from three to five weeks, and sometimes much longer. They are observed from within a few weeks to a few months after infection; sometimes earlier, occasionally as late as eighteen months. They are far the more frequent in tuberculous subjects who have contracted syphilis.

Histologically they are composed of small-celled infiltrations into the corium and into dilated hypertrophied papillæ. Hence they occur in localities where papillæ exist. Consequently they cannot occur below the vocal bands. They are quite red when recent, but soon change to light gray as the epithelium thickens; they then appear as small, wrinkled, opalescent, flattish, ovoidal elevations, varying in size from pin-heads to small peas; depressed in the centre when mature, and when recent circumscribed with a peripheric inflammatory areola. They may subside without trace. When erosion takes place, the surface becomes punctatedly red from exposure of the papillæ. They may undergo destructive ulceration. The opinion is held by some that superficial ulceration is always due to their disintegration; and that they must have existed in many cases in which they have not been observed. They may become the starting-points of small pointed vegetations, histologically identical with papillomata. These are probably non-specific in character, though due to irritation excited by specific processes. They do not undergo ulceration, and rarely undergo absorption under specific medication. When forcibly removed, they repullulate quickly. Similar vegetations sometimes project from the edges of ulcerated patches of tissue. Though usually small, sessile, and multiple, they may acquire such bulk as to interfere seriously with respiration.

The erosions which occur on the surface of the papules or upon simply erythematous mucous membrane are usually superficial, but may extend through the mucous membrane and beneath it, under bad hygienic conditions. Under slight provocative exposures to cold and wet, fluxionary oedema sometimes takes place in their vicinity, occasionally to such an extent as to be menacing to life. The epiglottis often becomes very much thickened; the vocal bands thickened and dentatedly eroded. There seems to be no tendency for secondary lesions to extend from the larynx to the trachea.

Tertiary lesions come under notice most frequently in the stage of ulceration, usually following the liquefaction of gummous nodules, gummous infiltrations, or true gummata, as may be. The epiglottis is the most frequent seat; so frequent, that its lingual and lateral ulceration has been erroneously deemed pathognomonic of syphilis; but destructive lesions may occur in every portion of the larynx. The ulceration is both serpiginous and deep-seated, and while more commonly unilateral, there seems practically to be little limit to its phagedenic destructive ravages under unfavorable conditions, as it destroys and penetrates all the tissues, soft and cartilaginous. Slight provocation may produce fluxionary oedema in this stage also, which may be of the most serious character. Serious hemorrhages may occur from penetration of bloodvessels; and apnoea may ensue from incarceration of fragments of necrosed cartilages and soft tissues. Ulceration may be attended with proliferative vegetations which may occlude the air-passages. Superficial ulceration may heal with moderate cicatrization which eventually becomes hardly noticeable. Deep and extensive ulcerations heal under peculiar whitish, lustrous, stellate, retractile cicatrices, similar to those which follow burns. Instead of cicatrization, adhesions may take place between contiguous raw surfaces, and strictures of various kinds be formed in consequence.

The gummous lesions preceding these ulcerations are of three kinds: small gummous multiple nodules or nodular syphilides; diffuse gummous infiltration; and gummata proper, usually isolated.

Small gummous nodules (nodular syphilide, Lewin) vary in size from that of small bird-shot to that of peas, and are usually grouped in well-defined determinate figures in the body of the mucous membrane, and often so contiguous as to appear confluent. Gummata proper present as firm hemispherical nodules or tumors, usually isolated, from the size of peas to that of cherries or almonds, and sometimes much larger in the connective tissue beneath the mucous membrane; usually uniform in outline, sometimes lobulated; undis-

colored or reddish at the base, and yellowish at the summit. Gummous infiltrations present as more or less longitudinal or more diffuse sub-mucous thickenings corrugating the surface of the mucous membrane. All these products may undergo absorption.

When not absorbed, gummous nodules undergo purulent liquefaction. At this time they become softer, and more yellowish at the summit, the mucous membrane at the base becoming more inflamed and thickened; the whole mass looking not unlike a furuncle. The summit becomes perforated, and gives exit to thickened, yellow pus, with granular admixture of débris at first. The orifice rapidly enlarges by ulceration until it becomes fully as large in circumference as the nodule was, or larger; and readily coalesces with ulcerations from contiguous nodules. The ulceration extends in depth until it occupies the entire volume of the nodules, and then may penetrate all the tissues beneath, even to the perichondrium and cartilage.

The ulceration of the nodulous syphilide, as studied in a series of cases by Lewin, is said to take place more from periphery to centre than the reverse, being shallow at first, and then gradually deepening. The ulcer is round, depressed, and sharply bordered. Its bed is covered with a secretion which, from previous fatty degeneration, or purulent metamorphosis, is either thickish, or nearly lardaceous, or composed of purulent detritus.

The more longitudinal and the diffuser gummous infiltrations undergo liquefactive ulceration much more slowly; but the subsequent ulceration, when unchecked, extends much more rapidly, and becomes more readily serpiginous and phagedenic; so that, coalescing with similar conditions in the vicinity, large surfaces in continuity become involved in its ravages. As it extends in superficies it penetrates slowly in depth until it also involves the deeper structures close to the perichondrium, and sometimes to the cartilage. Ulceration varies in rapidity, extent, and penetration according to the succulence or resistance of the tissues contiguous. The ulceration from diffuse gummous infiltration is preceded, according to Lewin, by extensive fatty degeneration of its surface, which gives it an almost grayish-white tinge. This is soon followed by actual defects which, at first shallow, increase in depth, and gradually penetrate to the perichondrium and the cartilage. These ulcers are characterized, like those from the nodules, by sharp definite circumscription, and by their being surrounded with an inflammatory swollen zone. They appear often as though a piece of swollen tissue had been cut out. The edges are often beset with slight crenations which give them a gnawed appear-

ance, but are never undermined; and their bottom is covered with a yellowish-white adherent mass, composed of pus, fatty detritus, and shreds of tissue. Gummata proper sometimes remain unchanged for prolonged periods. When they undergo degenerative metamorphosis there is formed, according to Lewin, only the characteristic viscid fluid, suppuration being exceptional. Ulceration takes place, however, in some instances, and penetrates deeply into the tissues beneath, as in the other two forms. Under unfavorable hygienic conditions of system, or of surroundings, the phagedenic ravages may become uncontrollable. They have been known to attack an artificial opening made to prevent suffocation by a gumma (Holden, *New York Medical Journal*, January 29, 1887).

Perichondritis and chondritis being set up after either form, the ulceration may penetrate the cartilage to the tissues external, forming a perichondrial abscess, which ruptures externally by a more or less circuitous route, whence the fragments of dead tissues are discharged.

Taken in point of frequency the cartilaginous structures seem to be vulnerable in the order following: epiglottis, posterior vocal processes, arytenoids, supra-arytenoids, cricoid, cuneiform, and thyroid. Coming to the softer parts, the vocal bands are attacked next in frequency to the epiglottis, the left band far more frequently than the right; the interior supraglottic walls of the larynx, the aryepiglottic folds, the interarytenoid fold, the posterior wall, the ventricular bands, the subglottic walls of the larynx, the exterior of the soft parts in the pyriform sinus. When the cartilages are attacked, whether primitively or consecutively, the chain of morbid phenomena is perichondritis, chondritis, calcification, caries, necrosis, and elimination of sequestra in crumbled masses and in fragments. The elimination of dead cartilages may consume months, and even years. It usually takes place by the interior route, occasionally by the exterior. In both instances abscess and fistula are formed; and elimination of large fragments by the interior route sometimes produces suffocative paroxysms, and occasionally actual suffocation.

The epiglottis, as repeatedly noted, is especially vulnerable to the syphilitic process, and every variety of lesion possible may ensue in any extent, from insignificant erosion to complete destruction, the character of the lesion depending upon that of the structure destroyed. It is this, as pointed out by Seiler, which gives such an irregular conformation to the epiglottis when its glands have been destroyed.

Exulceration of the entire mucous membrane at the edge reveals the exposed cartilaginous structure as a yellowish-white stripe em-

bedded between two thickened masses of spongy-looking tissue. Ulceration of the cartilage often commences at the anterior surface in the form of a round ulcer with thickened excavated edges. Destructive ulceration usually progresses from the side and from the edge. When the valve is only partially destroyed, its remains may present two or more irregular fragments separated by fissures of varying depth, or a single fragment of any breadth, from a small stripe to nearly the entire bulk.

When totally destroyed, the orifice of the larynx is separated from the post-lingual sulcus by a more or less irregular ridge of ulcerated tissue, which, after cicatrization, presents as a pale, deformed stump. This, however, does not, as a rule, prevent gluttony, and in some instances does not even interfere with it; the occlusion of the larynx being effected by the base of the tongue, on the one hand, and by close approximation of the ventricular bands and sphincter-like approximation of the aryepiglottic folds, on the other.

The other cartilages, when the subject of destructive progressive ulceration, are macerated out of their investments, as it were. The ulcerative process extends into the cartilage, surrounding it, if a small one, or circumscribing a portion of it, if it be a large one. The cartilage then perishes by necrosis, is laid bare, and becomes detached from its connections, in some instances remaining entangled in a sort of pocket scooped out of the soft tissues. The necrosed cartilage finally breaks through to the interior, and is usually discharged by expectoration. If it be situated below the glottis, paroxysms of suffocation may ensue, or even actual apnoea, as from any other foreign body. Exfoliations of the cricoid cartilage are the most frequent source of these untoward results, which, however, sometimes ensue from exfoliations of the thyroid.

The ulcerative process sometimes penetrates bloodvessels and hemorrhage follows. Such hemorrhage has been known to terminate fatally (Türck, *Klinik d. Krank. d. Kehle*, p. 413, Wien, 1886, illustrated).

The vocal bands frequently sustain permanent lesion varying from minute losses of substance to entire destruction. Transversal denuded erosion of the border is not uncommon, and detachment from the posterior vocal processes not infrequent. Sometimes abundant irregular papillary proliferations take place, forming mobile, projecting, pyramidal, or irregular dendritic vegetations, which project like soft, mobile stalactites into the interior, and which are large enough, in exceptional instances, to demand operative interference. Similar conditions and productions may prevail with the ventricular bands.

Superficial ulcerations may heal with moderate cicatrization, which eventually becomes hardly noticeable. In deep and extensive ulcerations, when cicatrization occurs, a peculiar lustrous, whitish, stellate, contractile cicatrix is formed, similar to the syphilitic cicatrix in other mucous membranes. Instead of cicatrization, adhesions often take place between ulcerated surfaces, and thus a variety of injurious morbid conditions occur. The vocal bands may become united by a broad fibrinous band stretching between them, or by a similar obturator, formed of their thickened and distended mucous membrane. The membranous web, thus formed between the vocal bands, usually unites them for a variable distance, commencing at the commissure; the posterior border of the structure being crescentic in outline. Exceptionally the cords may become involved their entire length, with an orifice in the central portion of the web (Navratil).

- This membranous union has been known to take place in six days (Rossbach : Langenbeck *Archives*, vol. xiv.). In a case watched by Sommerbrodt (*Berlin. klin. Woch.*, April 1, 1878) the anterior third united in fourteen days, and the union of the bands was complete in six weeks. In other cases the vocal bands become united without any membrane intervention.

Other adhesions sometimes take place which may seriously impair glutton, phonation, and even respiration. These comprise depression of the epiglottis to one side or the other, or to an aryepiglottic fold, and preventing proper closure of the valve or complete elevation; adhesion of the epiglottis to either lateral pharyngeal wall; adhesion of ventricular to vocal band, sometimes preventing closure of the glottis, and often producing a shrill, weak, piping voice; adhesions anteriorly of the two vocal bands or of the two ventricular bands; adhesions of the inner surfaces of the mucous membrane of the arytenoid cartilages, so as to fix the vocal bands immovably in the median position. Other results of syphilitic laryngitis are hypertrophies, diffuse and discrete, of mucous membrane, connective tissues, or muscular substance, and consequent stricture, varying in extent, locality, and interference with function; myopathic paralyses; muscular atrophy, and the development of morbid growths.

Perichondritis or chondritis, whether following ulcerative destruction of the soft tissues or preceding it, usually excites considerable fibrinous infiltration into the adjacent submucous connective tissue, producing a chronic fibrinous oedema. When extensive, this produces suffocative symptoms, and may threaten asphyxia. Sometimes the submucous infiltrations become organized and transformed into dense fibrous tis-

sues incapable of undergoing absorption, and thus they produce deformity, occlusion of the larynx, and stricture. The strictures are often incapable of yielding to systematic dilatation, even when instituted early; and hence tracheotomy is usually necessary to provide artificial means for respiration below the seat of obstruction. After tracheotomy, the process may progress to complete obliteration.

These strictures are of the most varying form and calibre, some of them distorting the configuration of the interior of the larynx almost out of recognition. Fortunately, most of them occur in the supraglottic region, where they are far more accessible to effective treatment.

Lesions of either soft tissues or cartilage in the neighborhood of the important crico-arytenoid articulations excite non-specific inflammation of the joint which may produce true or false ankylosis. Syphilis is probably the most frequent cause of this lesion. When the specific process invades the joint, the ligaments and perichondrium suffer; and then true ankylosis, or luxation, or disarticulation, and even discharge of the arytenoid and supra-arytenoid cartilages may ensue.

In the latter stage of unrestrained lesion, the cachexia is much the same as in analogous advanced stages of tuberculosis.

Myopathic paralyses of the muscles of the larynx may occur in the later periods of secondary syphilis, and at any period of tertiary syphilis. They are most frequently unilateral, the left side being affected far oftener than the right. The onset is often sudden or acute, following severe or sudden exposure to cold and dampness. The paralysis often affects the dilator muscles, and bilateral paralysis of the dilators is not infrequent. Paralyses of the arytenoid muscle and of the entire constrictor group are the most frequent varieties. These paralyses differ in their pathological origin from other examples of paralysis in syphilis, which are due, respectively, to compression of the tract of the nerve-supply by diseased tracheo-bronchial glands or other structure, and to neural or cerebral lesions which present in the latter stages of the confirmed dyscrasia.

Tertiary lesions of the trachea are first observed so very frequently in the stage of ulceration, that it had been assumed that tertiary syphilis of the trachea always produces ulceration (Vierling). Schech and others have reported instances of resorption of gummata under specific medication. The clinical tendency, however, is to ulceration. Tracheal ulcerative lesions are sometimes unassociated with lesions elsewhere in the aërial tract. Much more commonly they are found associated with similar lesions in the larynx, in the bronchi, or in both.

Pharyngeal syphilis exists in many instances (thirty out of forty-six,

collated by Vierling), and pulmonary syphilis in not a few (six out of fifty, Schech). They are often found associated with additional syphilitic lesions at a distance. In a large proportion of instances a primitive bronchus is affected, the left one the more frequently; in some, both primitive bronchi; in a few, the smaller ramifications (Vierling); and, exceptionally, even the minutest (Lancereaux). In some instances syphilitic lesion is confined to the bronchi (five cases, by Vierling). The upper portion of the trachea suffers most when the larynx is involved; the lower portion, when the disease is isolated or associated with syphilis of the bronchi. In some instances the middle portion alone suffers (Vigla and Charnal, Berger, Mackenzie, of Baltimore, Semon); exceptionally, the two extremities, with complete conservation of the middle portion (Tessier, cited by Rey).

When not occurring in direct continuity with similar lesion in the larynx, the most frequent seat of ulceration is in the anterior surface of the lower portion of the trachea just above the bifurcation, whence it extends upward, or in patches continuously sometimes as far as the cricoid cartilage; sometimes almost completely around the interior in periphery, occasionally completely around. Multiple perichondritis is easily set up and results in abscess, denudation of cartilage, calcification, caries, and necrosis. Portions of dead cartilage are sometimes coughed up in fragments. Sometimes semi-detached portions project into the interior and interfere seriously with respiration and with expectoration. The ulceration usually begins in a number of small ulcers which extend in depth and in periphery, baring the perichondrium, and causing portions of the cartilaginous rings, or entire rings, to undergo denudation, necrosis, and exfoliation. Coalescence with similar ulcerating surfaces, or phagedenic extension sometimes produces very extensive ravages which may involve nearly the entire circumference of the trachea, and nearly, occasionally quite, its entire length. Flaps of detached membrane sometimes fall over, producing valvular impediments to inspiration, or to expiration, according to the position of the attachments. The cicatrization of annular ulcerations produces stricture often so low down as to be beyond relief even from tracheotomy, the parts not being well adapted to respond to artificial dilatation. The strictures are irregularly ovoidal in shape, sometimes funnel-shaped, and of varying thickness from a few lines to that of several rings.

These cicatrices may reduce the calibre of the trachea so considerably as to prevent respiration. Occlusion to the calibre of a crowquill is not uncommon, and still greater occlusion has been noted in some

instances. Annular stricture at the bifurcation may become so great as barely to admit the passage of a delicate probe. (Obtulowicz: *Cent. f. Chir.*, 1879, No. 7.)

Irregular annular dilatation of the trachea is often produced by the pressure of the air current above the stricture and sometimes below it; and dilatation of the bronchi is not uncommon.

Projecting ridges of cicatricial tissue below the point of stricture are sometimes so located as to occlude the inferior orifice of a tracheal canula more or less, a point not sufficiently recognized, for it might be practicable in some instances to push a canula into a position which would allow its inferior extremity to pass the obstruction.

Stricture of the bronchi is rare. It affects the left bronchus more frequently (Verneuil, *et al.*); sometimes the right one (Wilks, *et al.*); occasionally both (Virchow, *et al.*). The connective tissue around the strictured portions usually undergoes permanent sclerotic proliferation. Sometimes there is great peritracheal sclerosis, sometimes none. The peritracheal glands may undergo great enlargement. All these conditions superadded to the internal stricture, may greatly increase stenosis.

Ulceration sometimes penetrates through the trachea producing abscess opening into the œsophagus or the mediastinum, the aorta (Rokitansky: *Path. An.*, Bd. 111, p. 22; Wilks: *Trans. Path. Soc.*, London, 1865, p. 52), the pulmonary artery (Kelly: *Id.*, 1872, p. 45), or the vena cava (Turner: *Id.*, xxxvii. p. 117). In at least two instances of ulceration of the left bronchus, the left branch of the pulmonary artery has been found perforated. (Vierling).

Inflammation around the trachea or bronchi sometimes produces adhesions to the œsophagus or to other tissues, which depresses the trachea and larynx and impairs their upward movements in glutition. Sometimes it produces peritracheal or tracheo-bronchial abscess. Abscess of a bronchus, sometimes deeply seated, has occurred under my own observation after tracheotomy; apparently as a result of too assiduous swabbing of the canula and pushing the feather beyond its outlet.

The lesions of hereditary syphilis are almost identical with those of the gummous infiltrations of tertiary syphilis. They sometimes appear very early. Ulcerations have been noticed in infants at two months of age (Parrot: *Prog. Méd.*, 1878, p. 653). Stricture from perichondritis has been noticed at the same age (Fränkel: *Wien. med. Woch.*, 1868, No. 18; Parrot: *loc. cit.*).

Symptomatology—The laryngeal symptoms of secondary syphilis

are not characteristic. They are chiefly comprised in dissonant alterations of the voice, either hoarseness, dysphonia, and in some cases occasional or temporary aphonia. The hoarseness is supposed to have some peculiarity which has been termed *raucesso syphilitica*; but this is not the case. In some instances it is simply due to the catarrhal laryngitis, in others to paresis of one or more of the constrictor muscles, or possibly to paralysis of the tensors. Respiration is not affected except in those instances in which oedema occurs in such a position as to occlude the passage for air, when it will be announced by dyspnoea and stridulous respiration, the characteristic symptoms of that condition. Titillation and cough are not as frequent as in inflammations of other origin. In many instances there is no tickling and no cough, no pain and no dysphagia.

Dysphagia is not present unless there be oedema of the parts utilized or pressed upon in glutition.

In tertiary syphilis of the larynx the symptoms are usually those of impairment of phonation, followed in severe cases by dyspnoea and stridor also, chiefly inspiratory. The stridor is worse at night from inaction of the auxiliary muscles of respiration. Should the mechanical impediment to respiration increase, inspiratory depression of the soft parts below the sternum takes place. If relief is not obtained, artificially or otherwise, asphyxia supervenes from imperfect aëration of the blood. Suffocation may occur suddenly from impaction of detached cartilage; but is more frequently slow enough in its approaches to allow time for tracheotomy.

Titillation and cough are more frequent in the earlier stages than in secondary syphilis; but they diminish after ulceration has taken place, except in so far as they are produced from time to time by morbid products detained upon diseased and adjacent surfaces. Pain is infrequent before the period of ulceration; after that it may be severe, and radiate into the ears as in other ulcerative diseases. In the early stage there is no expectoration. The earliest expectoration is of collateral catarrhal products only. As ulceration progresses it becomes muco-purulent, and then purulent and sanguineo-purulent, and mixed with detritus according to the stage and location of the lesion.

If gangrene takes place the odor becomes fetid; and the expectoration contains fragments of dead soft and cartilaginous tissue, as may be.

Dysphagia ensues when the disease is in a locality to interfere with glutition, and odynphagia when ulcerations have occurred in the same localities.

In tertiary syphilis of the trachea the symptoms affect mainly the function of respiration, the voice often remaining normal even when breathing is seriously embarrassed.

Pain along the course of the trachea, if constant, is indicative of lesion at that particular point. Cases may run their entire course without any special symptom, even in the presence of stricture of the trachea, and of the bronchi, and of extensive disorganization as revealed at the post-mortem examination.

In hereditary syphilis, the symptoms are sometimes congenital and may remain practically continuous for years. Respiration and phonation are both affected. The cry of the infant sometimes possesses a shrill metallic resonance which has been compared to that of a tin trumpet. Cough is more frequent in the child than in the adult. Glutition is often difficult and sometimes painful. Expectoration occurs in the suppurative stages when the child is old enough to expel the products, which by infants are swallowed or retained in the air-passages. Laryngismus is a symptom of frequent occurrence in young children.

Etiology.—The probable condition attracting the manifestation of constitutional syphilis to the larynx is superficial catarrhal laryngitis from hereditary or acquired proclivity, or from exposure, or from abuse of tobacco, alcohol, or other indulgence, or from misuse of the voice. Such exposures cause more males to be affected than females, as there is no assignable sexual reason for preponderance. Tracheal lesions, on the other hand, have been reported more frequently in females, probably because the laryngeal lesion is attended to more promptly by the male. Syphilitic disease often extends by continuity from the oropharyngeal region to the larynx, principally along the pharyngo-epiglottic fold to the epiglottis, and thence along the aryteno-epiglottic fold, and from the two structures to the interior. Hereditary syphilis has been observed in intrauterine life (Monti: *Med. Times*, Phila., April 28, 1877, p. 336). Hereditary syphilis of the intensest character has been occasionally observed at a very early age, as in the case of an infant whose symptoms began with coryza in the tenth week of life, and terminated in death by suffocation from stenosis nineteen days later. Post-mortem, with examination, revealed, in addition to syphilitic lesions in the liver, destructive perichondritis of cricoid and left arytenoid cartilage, and fatty degeneration of arytenoid and both posterior crico-arytenoid muscles and the left superior nerve (Fränkel: *Wien. med. Woch.*, 1868, Nos. 69, 70, cited by Ziemssen and by Mackenzie). Children less than a year of age often show

laryngeal lesions of hereditary syphilis, and ulcerative lesions have been seen at two months of age (Parrot: *Prog. Méd.*, 1878, p. 635). Many cases occur in children but a few years of age, and sometimes the manifestations are deferred to the period of puberty or even later. Indeed, in opposition to the received opinion of syphilographers, I have reason to believe that in a few instances I have seen its manifestations delayed as late as the third and even the fourth decennium. True, in such instances as the latter it is quite possible that infection may have been acquired in some method unknown, without having been followed by any secondary manifestations, or that early hereditary manifestations may have escaped recognition. The secondary manifestations occur most frequently in adolescents and young adults. They appear most frequently at periods varying from a few weeks to a few months after infection, sometimes as late as the fourteenth or seventeenth month (Morgan). Tertiary lesions are most frequent at rather maturer ages, and occur occasionally in quite advanced life. They have been reported as early as the sixteenth month (Türck, op. cit.), and as late in their first appearance as the thirtieth (Türck), and even the fiftieth year (Mackenzie). Tracheo-bronchial tertiary lesions have been reported as appearing as early as the ninth month after infection, but these lesions are usually coincident with the laryngeal lesions when not immediately consecutive to them.

Most of the instances of tracheal syphilis occur in individuals whose employments expose them to irritation from dusts of various kinds (Vierling: *Deutsches Arch. f. klin. Med.*, 1878, Bd. 21). Hereditary tracheo-bronchial syphilis is far less frequent than the laryngeal forms. It has been observed before the age of puberty.

Diagnosis.—Differential diagnosis between secondary and tertiary lesion is sometimes difficult, particularly in the transitional period especially described by Whistler. The discriminating characteristics are less well marked in laryngeal syphilis, perhaps, than in any other variety.

It may, however, be broadly stated that secondary lesions, erythematous, papular condylomatous, or paralytic, are superficial; and that tertiary lesions are gummatous, ulcerous, carious, necrotic, and deep-seated. Laryngitis occurring within a few months of infection, is almost invariably secondary. Lesions appearing before the termination of the third year are presumptively secondary: those appearing within the third year, secondary, or transitional: and those appearing after the termination of the third year, tertiary. - Nevertheless, secondary lesions may be ulcerous, and undoubted tertiary manifestations have been recognized even within nine months of infection.

The history of the case, and the previous or actual presence of manifestations of syphilis elsewhere, are the main positive factors in the diagnosis of specificity, especially in the early stages of either variety. The later lesions of tertiary syphilis are often sufficiently characteristic; sometimes not at all so. In cases of doubt, antisyphilitic treatment will almost always detect a lesion of syphilitic origin, but not invariably. Hence, in instances of strong suspicion, the various methods of antisyphilitic medication should be thoroughly tried before that test is abandoned. This suspicion is justifiable in cases of obstinate chronic laryngitis, whether ulcerative or not, in individuals in whom no other appreciable local or constitutional cause can be detected.

Laryngoscopic inspection is an invaluable aid in diagnosis; though practically indispensable, it is inadequate for fully appreciating the extent of deeply seated lesions; and its revelations are not always sufficient to establish the diagnosis in the absence of corroborative lesions elsewhere. Erythematous and catarrhal inflammation of secondary syphilis, when diffuse, are not to the ordinary eye distinguishable from similar non-specific conditions. Circumscribed erythema, though usual in syphilis, occurs in non-specific laryngitis also; consequently, that condition alone is insufficient for discrimination. Patchy erythema on the vocal bands, and elsewhere, may be regarded as characteristic. Not so, however, the shaded pigmentations at the extremities of the vocal bands.

Symmetric bilateral localization of erythematous and other patches is highly characteristic of secondary syphilis; but a contrary condition by no means excludes the diagnosis. Isolated bilateral congestions of the supra-arytenoid structures and of the Wrisbergii have been cited as pathognomonic. Nothing can be more fallacious or misleading. Enlarged inguinal and post-cervical glands furnish excellent corroborative testimony of syphilis.

Papules, or condylomata, upon an erythematous mucous membrane, are to be considered pathognomonic. Their recognition may require an exceptionally good light on the one hand, or repeated examinations on the other. They must be carefully discriminated from minute collections of mucus or of saliva.

Diffuse gummous infiltration is to be distinguished first from inflammatory syphilitic infiltration by the coexistence of gummous processes elsewhere, its more circumscribed contour, and its sharper definition. Differential diagnosis is much easier after it has reached the stages of liquefaction and ulceration.

Syphilitic ulceration usually proceeds from above downward, rarely

in the opposite direction, and often in extension from ulceration in the pharynx. Repair usually proceeds from below upward. Apart from these guides there is nothing positively characteristic enough to determine an ulceration to be syphilitic in character by mere inspection.

The absence of pain has been regarded as characteristic; but, on the one hand, carcinomatous ulceration often exists without pain, and, on the other hand, the ulcerative lesions of syphilis are sometimes attended with lancinating pains of the most severe character.

In the gummatus stage of tertiary syphilis diagnosis is not difficult. Nodular syphilides and gummata are recognized in the forms and at the localities mentioned under pathology, page 220. They may be confounded with other neoplasms, and with abscess. In cases of doubt, antisyphilitic treatment should clear up the diagnosis. The physical distinction between gummata and condylomata may in some instances be obscure (Semon).

The main reason why gummata are so infrequently seen, as to have led some observers to an erroneous opinion as to their rarity, is that many patients do not present themselves until after the stages of liquefaction and ulceration have become established. When this stage has not been observed, and the larynx, as is more usual, is not inspected until after ulceration has considerably progressed, the appearances are not always characteristic. They may be confounded with those of lupus, carcinoma, and tuberculosis. The general diathesis, the clinical history, the existence of enlarged submaxillary and post-cervical lymphatic glands, the character of concomitant affections of the skin and mucous membrane, the aspect of the patient, assist in discrimination. Sometimes, too, tuberculous and syphilitic lesions coexist.

The typical tertiary ulcer, sharply defined, and below the surface of the mucous membrane, is more or less circular when recent, more or less crenated when reparation is taking place at one or more points of the circumference, and looking as though cut out with a punch when in oedematous tissues. Its borders are sharp, elevated, but not often undermined, and more or less rounded in their visible outline, and are surrounded by a more or less circumscribed inflammatory areola in the mucous membrane. The bottom feels hard to the probe on palpation. The bed of the ulcer is grayish, or lardaceous, yellow from fatty detritus, and covered with adherent concrete pus, through which, here and there, prominent rosy granulations often project. The surrounding tumefaction is harder and more indurated than in other varieties of ulcer. Purulent accumulations are rather indica-

tive of the syphilitic process. At a later date denuded or necrosed cartilage may be visible in suitably located ulcers.

In cases in which neoplasms have become developed at the seat of existing ulcerations, or of cicatrized ulcerations or erosions, it is often impossible to pronounce as to their nature, even by the test of anti-syphilitic treatment. Not only do such neoplasms exist independently of the syphilitic process, or as the result of irritation provoked by syphilitic process in the vicinity; but when undoubtedly syphilitic in origin, they rarely disappear under specific medication. Tertiary syphilis is usually recognizable in the stages of œdema of the larynx; and almost always in the reparative stages of cicatrization, or in the subsequent stages of stenosis, whether from cicatricial retraction or from organization of effused products.

Tracheal syphilis is recognized by laryngoscopic detection of the lesion or by the special symptoms narrated. It is often beyond laryngoscopic detection when in the lower portion of the trachea, frequently so when in the middle, and occasionally so even when in the upper portion; sometimes on account of tumefactions above the lesion, sometimes because the lesion itself is out of the line of vision. Tracheal and tracheo-bronchial obstructions are often differentiable by the absence of retraction of the head and of extensive downward and upward movements in respiration, as occur in obstructions within the larynx (Gerhardt: *Deutsch. Arch. f. klin. Med.*, 1867, Bd. ii.); the descent in infra-laryngeal obstructions being no greater than one centimetre.

Prognosis.—Secondary lesions, even when ulcerative, are most frequently curable without cicatrix or without any other sequel. Exulceration of the vocal bands sometimes leaves permanent defect of tissue. The prognosis is good except during temporary conditions of œdema, when it may be grave for the time being. The inflammatory congestion and turgescence are more chronic than in catarrhal inflammations, and are often recurrent. Actual hyperplasia is apt to remain permanent, even after cure of the syphilitic lesion, despite the most assiduous treatment; and when it occupies a vocal band the voice may be permanently impaired. The singing voice may remain imperfect, although the conversational voice be fully restored; the injured tissues being unequal to the nicety of adjustment requisite for cantation.

In tertiary lesions the prognosis depends mainly on two factors: First, on the impairment of the general health, and the significance of lesions elsewhere, especially in the brain and meninges, and in other important organs. Second, in the extent of ulceration and the char-

acter of deformation or stricture which may follow. Temporary gravity exists in the presence of œdema; during the period of exfoliation of necrosed cartilages, and in acute bilateral paralysis of the dilator muscles, the result of exposure to cold or other cause, or to unilateral paralyses when the opposite side is immobile from gumma, or from crico-arytenoid ankylosis (Charazac: *Rev. Mens. de Lar.*, Sept. 1884), any of which conditions may demand prompt tracheotomy to prevent death by suffocation. Ulcerative lesions of the trachea may be fatal by hemorrhage from penetration of large bloodvessels; by pneumonia from access of food through perforation of œsophagus (Berger); or by septic processes due to rupture of the mediastinum. Permanent impairment of the voice is to be expected in all cases in which the vocal bands undergo serious injury, and in many in which permanent changes are likely to take place in other structures contiguous to the glottis.

Gluttony is rarely affected, even after complete destruction of the epiglottis; and in exceptional cases difficulty is mainly confined to fluids swallowed without deliberation.

Stricture rapidly supervening upon hyperplasias is often amenable to active treatment, sometimes with striking rapidity (Krishaber, Lewin, Schech, etc.); but the more frequent stricture of slow progression can only exceptionally be brought under control.

Serious danger attends even cure of extensive ulcerative lesions in the interior of the larynx, for the resulting stricture, if severe, is likely to necessitate tracheotomy, with great probability of permanent retention of a canula. Stricture is rarely amenable even to excision of cicatricial tissue by external access. Subglottic stricture is much more serious than supraglottic, and tracheal far more serious than laryngeal stricture. Stricture of the trachea, when low down, is practically insusceptible of amelioration; and death by slow apnœa, or by sudden suffocation, is the usual outcome.

When the syphilitic cachexia has advanced so far as to have produced incurable lesions in important viscera or in the cerebrum, death may ensue from these causes despite sustained cure of syphilitic lesions in the larynx. In cases complicated with paralysis of the dilator muscles of the larynx from cerebral lesion, the death may take place by occlusion of the glottis and suffocation, or by encephalitis and coma.

In hereditary syphilis the prognosis is very much the same as in tertiary syphilis; being much worse in infancy and childhood than in more delayed manifestations. The small size of the larynx renders

stricture and intercurrent œdema far more significant; and the tendency to spasm of the larynx inherent to all laryngeal affections in childhood presents an additional element of danger. Fatal issues from these three causes are not infrequent. An element of uncertainty as to the final result remains in all varieties of syphilis of the larynx and trachea, due to the fact that permanent liability to recurrence prevails in many instances, despite the best apparent results of the most judicious treatment; and often, too, after prolonged intervals of immunity from any further manifestation of constitutional syphilis.

Treatment.—Fortunately, lesions even of great destructive and menacing tendency are amenable, as a rule, to treatment; often promptly.

The treatment, broadly stated, is that applicable to constitutional syphilis in general; mercury in the early manifestations and iodides in the late ones. In many of the latter, if not most, the mixed treatment combining the two specifics is the most serviceable. In congenital syphilis the gray powder is believed to be the most efficacious form of the drug. While willing to admit that secondary lesions often subside without traces and without much risk of subsequent tertiary manifestations, although mercury be withheld, I deem it the more prudent practice, and, therefore, the best practice, to employ mercury; in the belief that its specific constitutional influence affords the patient better protection as to future manifestations. As to the value of iodides in tertiary syphilis, there is no difference of opinion. Tonics are often indicated. All sources of irritation, exposures, excessive use of the voice, alcohol and tobacco, are to be avoided.

Sedative inhalations in vapor or spray are often of great topical benefit in subduing collateral inflammation; and antiseptic inhalations are indicated in gangrenous cases.

Secondary syphilis. Mercury may be administered by the stomach or by the skin. When the lesions are moderately severe or slow in progress, the corrosive chloride may be administered in doses of from one-sixteenth to one-eighth grain, three times a day. The green iodide may be given in doses gradually increased from one-sixth of a grain three times daily to the point of tolerance. The addition of extract of belladonna may cause it to be better borne by the stomach. In individuals in whom serious gastric disturbance is produced before any specific effect has been noted, and in seriously severe cases and cases of rapid progress, inunctions of a drachm of mercurial ointment daily are preferable, or pencillings with solutions of oleate of mercury in oleic acid, ten per cent. Lewin prefers hypodermatic injections of

corrosive chloride. Concurrent stomatitis is to be combated by the internal administration of potassium chloride, or the use of a saturated solution of that salt, or of a weak solution of potassium permanganate as a mouthwash. It is hardly necessary at the present day to mention that salivation is to be avoided. In my own experience topical medication is, as a rule, superfluous in non-ulcerative secondary syphilis, and often unnecessary in the presence of ulceration. When topical medication seems necessary, inhalations of sprays of corrosive chloride (Demarquay), half an ounce or more daily of a solution containing one grain to four ounces of water, are useful locally and constitutionally. In particularly obstinate conditions, especially in the presence of hyperplasias, the topical application of solutions of iodine and potassium iodide in glycerine (Schnitzler) half a drachm and a drachm respectively to the ounce, made daily or at longer intervals, sometimes accelerates the cure.

In the transitional stage and in the tertiary stages, the mixed treatment has been the most beneficial in my own practice; one-sixteenth to one-eighth of a grain of the corrosive chloride, five to ten grains of potassium iodide in half an ounce or more of the compound syrup of sarsaparilla, three times a day. It may sometimes be necessary to increase the dose of the iodide up to the point of tolerance. In such cases the "grain to drop" solution is the most convenient preparation. The danger of inducing œdema of the larynx by sudden large doses must not be ignored. When necessary, sodium or ammonium iodide may be substituted for the potassium salt, or hydriodic acid may be employed.

In the presence of œdema, hypodermatic injections of corrosive chloride (Lewin), one-thirtieth of a grain, twice a day for a day or two, and after improvement, at intervals of three days or more, have proved quite efficacious. If amelioration is not prompt, and if the patient cannot be carefully watched by an attendant competent to interfere in an emergency, it is best, in my opinion, to perform prophylactic tracheotomy, instead of awaiting its urgent indication. The same rule is applicable to threatening cases of extensive hyperplasia whether from specific or from non-specific infiltrations.

Nevertheless, remarkably happy results, even in urgent cases of these kinds, have frequently followed active treatment by inunction (Krishaber) and by hypodermatic injection (Lewin). Intubation of the larynx from the mouth (O'Dwyer) has been recommended as applicable in many instances of œdema and constriction heretofore

treated by tracheotomy. As yet, I know of no experience with intubation in this special connection.

Ulcerations heal more promptly when the constitutional treatment is seconded by topical cauterizations with fused silver nitrate, or with mercuric nitrate one part to from four to ten of water, or with cupric sulphate in crystal or in saturated solution. Chromic acid, one part in from five to eight of water, has long been extolled (Isambert). Some prefer iodoform (Morgan). On the other hand, extensive ulceration often heals promptly under the influence of constitutional treatment alone.

Vegetations, detached flaps of mucous membrane, and semi-detached fragments of necrosed cartilage call for operative removal with cutting forceps, evulsion forceps, or snares, as may be most convenient, when these products are so located as to interfere with freedom of respiration or to threaten such interference. When these manipulations are impracticable, tracheotomy may be requisite. When tracheotomy has been performed under any of the conditions mentioned, the canula is to be removed as soon as it has become apparent that its retention is no longer essential to the safety of the patient. Cicatricial stricture of the larynx may be treated by the introduction of the intubation tube through the natural passages (O'Dwyer). From recent observations I fear that intubation will fail, unless supplemented by occasional incision and divulsion. This treatment may possibly be applicable to stricture high up in the trachea. Stricture in the middle portion of the trachea requires low tracheotomy and the introduction of a canula long enough to reach beyond the constriction. O'Dwyer proposes incision of the trachea, introduction of the tube, and closure of the trachea over it. Stricture at the bifurcation is hopeless.

Paralyses, even those of the posterior crico-arytenoids, are usually amenable to anti-syphilitic treatment even when of considerable standing. This fact seems to indicate that the atrophy found in neurotic paralysis is not due to simple inaction of the muscle, but rather to trophic impairments of neurotic origin. Electrization may be employed when relief does not ensue from systemic medication.

Membranous webs, occluding the glottis from side to side, are to be divided by incision or by electric cautery, the edges cauterized, and readherence prevented, if possible, by frequent introduction of dilating sounds. These laryngoscopic operations are often rendered futile by insurmountable tendency to recicatrization, whereby the morbid condition is reproduced. Success in cases of this kind would seem to require exposure of the interior of the larynx by external division of

the thyroid cartilage, and excision of the whole of the cicatricial tissue (Mackenzie: *Med. Times and Gaz.*, August 19, 1871, p. 218).

When syphilitic laryngitis has existed for a long time, such an amount of destruction may have taken place, and such a degree of systemic poisoning, as to render recovery impossible. The constrictions produced by the cicatrices of extensive ulcers, and the adhesions between adjoining surfaces, in cases that recover, are often such as to render tracheotomy necessary, with the permanent use of the tube; for the constrictions following syphilis are not, as a rule, amenable to dilatation.

Threatened asphyxia or unconquerable dyspnœa, from gumma, loose cartilage, morbid growth, abscess, or œdema, may necessitate tracheotomy. Tracheotomy for the purpose of conquering dyspnœa due to tumefactions in the larynx is perfectly justifiable, and usually successful. It is likewise justifiable for the mere purpose of securing rest to the organ—much more so, indeed, than in analogous conditions attending tuberculosis.

The treatment for local adhesions consists in relieving the tension as far as possible by laryngoscopic division of the constricting bands of tissue, with knife or with electric cautery, and then cauterizing and recauterizing the adjacent surfaces, to prevent fresh adhesions. These cases require careful watching and prompt attention to overcome the disposition to recurrence, which is very apt to take place in spite of all efforts. When the epiglottis is implicated, much good can be done by teaching the patient to move the organ frequently by means of his forefinger.

In a case of stenosis due to "concentric hyperchondrosis," as a result of the hyperplastic chondro-perichondritis, Prof. Heine performed a successful resection of the anterior portion of the thyroid cartilage, splitting that structure in the middle line, separating the perichondrium and superjacent soft tissues with the elevator, to the distance of one-half its surface on the two sides, and then removing the denuded portions by longitudinal section with bone forceps. The patient rallied so well from the operation that an artificial vocal apparatus could be substituted for the ordinary canula on the fifth day. He became able to resume work after a while; but the disease made new inroads, and he died, eleven month later, in an advanced stage of tuberculosis.

Despite the most judicious treatment, and the most satisfactory immediate results, recurrence or recrudescence takes place in many instances at variable intervals, requiring resumption of specific treat-

ment. The most satisfactory results claimed by any writer have been in cases actively treated by Lewin with hypodermatic injections. It is advisable to keep patients under observation for many months after active treatment has been discontinued. Mercuric iodide (biniodide) in small doses, one-twentieth to one-tenth of a grain, three times daily, may judiciously be given for prolonged periods during which apparent health exists. Potassium iodide, in diminishing doses, should be administered from time to time for a few days every month until the patient begins to show susceptibility to physiological effects from small doses; and then this susceptibility should be tested from time to time at intervals of a few months. Such supervision for two years at least seems to present the best prospect for riddance from the diathesis.

It may be mentioned in conclusion that, under intercurrent attacks of erysipelas, obstinate cases of tertiary syphilis of the larynx and trachea have undergone cure after having resisted all medicinal treatment.

THE TREATMENT OF CARCINOMA OF THE BREAST.

By SAMUEL W. GROSS, M.D., LL.D.,

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[Read September 26, 1888.]

Of operations which do not rank with major procedures, not one is more commonly practised by men not skilled in the manual of surgery than that of the removal of the mammary gland for carcinoma. The superficial situation of the organ, the ease with which hemorrhage is controlled, the flaps are united, and the dressings applied, all tend to make partial or complete extirpation of the breast a tempting field for the young surgeon. If to these considerations be added the great frequency of the disease, it will be seen that its treatment should constitute an instructive topic for consideration and discussion by this body.

In accepting your invitation, Mr. President, to make the opening remarks upon the subject, I take it that a brief narration of my own personal experience will prove to be more interesting than were I to deal with the practice of others, the more especially as the operation which I have performed is more thorough than the usual procedure.

At the outset I will state that in the management of so lethal an affection I have relied upon the scalpel, as I believe it to be the one and only measure which is capable of affording good results. It may be that some of my hearers are sceptical as to the propriety of interference. The old tradition that carcinoma is an outward evidence of a blood disorder, and that it cannot, consequently, be cured by operation, may still influence a few of our members. To these I may be permitted to say, first, that the leading minds of the world now admit that carcinoma is primarily a local growth; and, secondly, as I have elsewhere¹ conclusively shown, from an impartial examination of a large number of cases, that the knife not only prevents the local dissemination of the disease, its extension to the lymphatic glands, and the occurrence of secondary growths in a large percentage of cases,

¹ American Journal of the Medical Sciences for April, 1888.

but that it moreover prolongs life, and definitely cures one patient out of every eight and a half.

An operation in a suitable case having been decided upon, the one selected by the majority of surgeons is that with which we are all so familiar, namely, the inclusion of the nipple and a portion of the skin in two elliptical incisions, the reflection of the flaps, and the dissection of the gland from the surrounding tissues. Other surgeons, actuated by the desire to save as much of the gland as possible, limit their efforts to the extirpation of the tumor alone. The first of these procedures is faulty enough; the latter cannot be condemned in too severe terms; and yet, in his recent monograph on "The Operative Surgery of Malignant Disease," Butlin, I am sorry to say, recommends it. A knowledge of the changes which, starting from the tumor itself, ensue in the remainder of the breast, in the adjacent soft tissues, and in the associated lymphatic glands, which changes indicate the local extension of the disease along the lymph paths, ought surely to lead the surgeon to reject such irrational operations. In very exceptional instances a cure may be effected; but we all know what is the common result—a more or less rapid recurrence of the disease—a favorable issue being so uncommon after these incomplete operations that few, if any, of us have ever witnessed it.

Dissatisfaction with my own earlier results and those which I was enabled to follow in the practice of other surgeons led me, ten years ago, to adopt a radical procedure, the object being to effect riddance of all the tissues in which the experience of hundreds of years demonstrates that recurrence, or a new outbreak of the disease, takes place. Hence, in my operation, which is minutely described in the *American Journal of the Medical Sciences* for April, 1888, I amputate, by a circular cut, the entire breast with its overlying skin and fat, dissect off the pectoral fascia, and carry an incision into the axilla, through which I am enabled to extirpate its contents. If nodules should be found in the pectoral or intercostal muscles, they are also removed with an equally unsparing hand. The edges of the wounds are then approximated, the closure of the breast incision being greatly facilitated by raising the flaps from the subjacent tissues for an inch and a half to two inches, and the employment of button sutures. In some cases, the wound cannot be entirely united, so that it has to heal by the process of granulation.

In the discussion which will follow the reading of my paper, I will doubtless be asked, first, Why do you remove the entire breast and its surrounding tissues?, and, secondly, Why do you attack the axilla in

all cases? My answer is simply because recurrence, or a new outbreak of the disease, ensues in tissues which are left behind in the less radical modes of operating. The accumulated observations of surgeons show that recurrence may be anticipated in the skin and subcutaneous tissues, especially at or near the cicatrice; in the fascia covering the pectoral muscle; in the remnant of the breast from which the tumor alone was excised; in outlying lobules which were overlooked during the performance of the less complete operations, and in the lymphatic glands, particularly those of the axilla.

Answering these questions more fully, I would say that sound pathology, as well as experience, demands that the entire mammary gland along with its circumjacent tissues should be amputated, first, because we have to deal with a carcinomatous degeneration commencing at one point, from which the cells migrate in various directions into the remainder of the breast and the surrounding tissues, the extent of which migration into the lymphatics and their radicles it is impossible to determine with the naked eye; secondly, because the disease is sometimes multiple, and the smaller growths are only detected on examining the breast after its removal; thirdly, because minute lobules frequently lie at some distance from the main body of the gland, particularly toward the axilla and the clavicle, which may subsequently become the seat of a new outbreak, even as late as ten years, as in a remarkable instance recorded by Banks; and, fourthly, because nodules may be found in the subcutaneous tissues at a relatively great distance from the breast, which would certainly have escaped detection in the lesser operations.

My answer to the second question, Why do you attack the axilla in every case?, is because the axillary glands are almost always diseased, even though they cannot be felt prior to operation. Of my 45 cases, the glands were not palpable in 18, but in 15 of these they were present when the axillary space was opened. In 57 out of 65 similar cases, Kuester found that the glands were infected, so that our combined experience demonstrates that the glands are invaded in 86 out of every 100 cases in which there is no external evidence of their implication. Hence, if the axilla be not evacuated of its contents in every case, a subsequent operation will almost surely be demanded. In point of fact, I consider this step as the keynote of the procedure, and I refuse to operate if I am not permitted to have my own way in this regard.

Although the procedure which I have described may appear to be unnecessarily severe as to the sacrifice of tissue, and, at first sight,

seem to be attended with more risk than operations performed with a more sparing hand, I have still to present some facts which conclusively show that it is the best that has as yet been practised as regards mortality, freedom from local recurrence, and a final cure.

Of my 45 cases, 2, or 4.44 per cent., perished from the operation, and 5 patients were lost sight of after recovery. Deducting the 7 that died and could not be traced, 38 cases show local recurrence in 11, or 28.95 per cent. Including the deaths, out of 40 cases, 9, or 22.5 per cent., recovered. Of these, 1 died of an intercurrent disease in 7 years and 10 months, while the remainder are still doing well, 1 for 9 years and 10 months, 1 for 9 years and 1 month, 1 for 6 years and 9 months, 1 for 4 years and 3 months, 1 for 3 years and 11 months, 2 for 3 years and 6 months, and 1 for 3 years and 5 days.

Let us contrast these results with those afforded by the next best operation, namely, the removal of the breast by flaps and the evacuation of the contents of the axilla in every case. Of 328 cases of this description in the hands of Banks, Kuester, and von Bergmann, 10.67 per cent. perished, there was local recurrence in 54.92 per cent., and 15.15 per cent. were cured, so that my operation is safer by 6.23 per cent., is less liable to local recurrence by 25.97 per cent., and affords 7.35 per cent. more of permanent recoveries.

It is quite certain that the greater immunity from local reproduction of the disease in my operation is due to the total amputation of the breast, its skin, and enveloping fat. Despite the fact that my results are better than any that have heretofore been recorded, a careful examination of the cases of Banks shows that he met with only 3.88 per cent. more of recurrences than I have, and that his percentage of recoveries, namely, 20.77, is only 1.73 per cent. less than my own. Hence, I felt that I might possibly have sacrificed too much of the skin; and, since June, 1887, I have so far modified my operation in 10 cases, the skin in none being apparently affected, as to save enough of that structure to admit of nice approximation of the edges of the wound. All recovered from the operation; one died from recurrence in the axilla and metastasis; one is living with axillary reproduction; in not one has there been local reproduction; one patient is free from disease at the end of fifteen months; one for one year; one for nine months; and the remainder for periods varying between three and eight months. These cases can be followed, and whenever I am sure of being able to trace my patients I shall give this procedure a fair trial. When, on the other hand, the patient lives at a great distance, or her circumstances are such as to prevent her visiting me in the event of recurrence, I will adhere to the more extensive operation.

DISCUSSION.

DR. JAMES COLLINS: I have on two or three occasions, in the case of small tumors in comparatively young women, allowed myself to be overruled by the patient and her friends, who urged that it would be a pity to sacrifice so much of the breast as I proposed, to performing a restricted operation; but I have regretted it in every instance, and I can assure Prof. Gross that I will never offend again. That which Dr. Gross describes as the "second-best operation," the large elliptical incision with thorough removal of tissues beneath the skin and exploration of the axilla, is the one I have practised in the majority of my cases. The prolongation of life in those I have been able to follow would average not quite three years.

The great difficulty we have to contend with in mammary tumors is to secure consent to an early operation. Patients go from surgeon to surgeon, and from city to city, and finally yield consent as a last resort or in deference to an authoritative opinion; usually too late to escape recurrence. The recurrence which then takes place, despite skilful operation by a distinguished hand, will be cited in discouragement of timely operation in other cases, by a large circle of relatives and friends.

The exploration of the axilla, which the lecturer in his masterly demonstration has so justly emphasized, should never be omitted. Nor is it too trite a remark to recall that antiseptic methods, which have so improved the results of extended operations, should here also remove any lingering dread of opening up large spaces; for they have improved the outlook of the procedure by assisting the rapidity of healing, and excluding the danger of septic accidents and sequelæ.

DR. O. H. ALLIS: I have nothing to add in discussion; I have repeatedly seen Prof. Gross operate, and there is one point in his method of operation to which I would call especial attention. The breast having been covered for twenty-four hours with antiseptic solutions and his hands being thoroughly aseptic, he carefully palpates the pectoral region for outlying nodules, marking the site of any that he finds with a pencil-stroke, and when he operates he does not dissect out these places but includes them well within the sweep of the line of incision. In other words, he cuts beyond the outer limits of the disease.

DR. JOHN B. ROBERTS: Dr. Gross has for many years taught us all the proper way to remove a breast—that is, to remove it thoroughly. In my own operations I have, whenever possible, employed the large elliptical incision; the advantage, and I confess the only one, being that when approximation of the edges of the wound is at all possible, it can by this method be more readily effected. No one who has learned from Prof. Gross the proper way to open the axilla would dare to neglect this portion of the operation. As to aseptic and antiseptic methods, there can be no difference of opinion among experienced operators; they are the only methods permissible in operative surgery. I would like to ask Dr. Gross how long it takes to repair one of the large spaces in what he calls the dinner-plate incision, and what

his opinion would be as to the prospects of a plastic operation to aid in hastening healing.

DR. R. BRUCE BURNS: Of all surgical cases these are the most unsatisfactory. In my earliest operations I did not open the axilla. Three cases operated on in this way are living for eleven, nine, and five years respectively. Of later years I have opened the axilla, and have been unfortunate. Recurrence has taken place in the cicatrices and even in the axillary tissues, perhaps in small glands not removed. I have thought, perhaps, it recurred in the adipose tissues. I have usually employed the elliptical incision. The method of leaving a large open wound to heal by granulation is rather hazardous. In all cases where I have had to depend upon extensive granulation there have been rapid recurrence and metastasis. There may also be limitation of the movements of the arm from matting of the tissues. It is wise always to attempt to secure union by first intention. It would be well to attempt to remove outlying nodules in the surrounding tissues. Where nodules occupy a portion of the gland (mammary) and are intimately attached to it, the whole organ should be removed.

Antiseptic measures are only so far useful as, in arranging them, you secure aseptic conditions. I believe thorough cleanliness in all respects, as to instruments, dressings, and the surgeon's hands, with good drainage, is all that is necessary in the treatment of the wounds of operations.

DR. GROSS, in closing the discussion, said: There are many points which might have been touched upon in the paper which I omitted for the sake of brevity. Societies do not like to listen to long papers, and the best speakers teach little in long papers. The points I have tried to emphasize are, the importance of a thorough operation, and the fact that its results are better than those of incomplete operations.

Now as to primary union. Of course, I want to get primary union whenever I can. Those who have never seen my operation would be surprised to see how close an approximation we can get by sliding the bistoury under the skin, say for from one to two inches, and then drawing the loosened flaps together with button sutures.

Sometimes when there has been very extensive disease, necessitating correspondingly extensive operation, we have a gap left to granulate of two or three fingers' breadth—never more than three fingers' breadth. Healing may be slow in a debilitated subject with a large wound, but averages about six weeks.

Now as to saving the breast, and only removing the tumor itself—I do not care for the breast. It is of no use. I am concerned in getting rid of all diseased tissues. What surgeon would undertake to remove a sarcoma of the thigh, for example, and for the sake of leaving a little more stump, make his flaps through infiltrated tissue? I should consider such a procedure criminal. Yet it is just what some surgeons want us to do in the breast.

In my last ten cases I did, for reasons stated in the paper, the lesser operation, and if I find it equally satisfactory in the end, I will adopt it altogether. I am not wedded to one operation, only so far as not only personal experience but the combined statistics of several operators with good results show that my operation has given the best results.

Dr. Burns has had an experience of coincidences. In the cases in which

he did not open the axilla and recovery took place, he had a free axilla. I judge that the doctor thinks recurrence takes place in granulations. Now it is a histological fact that granulation tissue will give rise to granulation tissue alone, and not to epithelial tissue. The granulating surface may be great or small; that has nothing at all to do with recurrence. In those other cases all the disease was not removed, and hence development again took place in the tissues forming the bond of union, or the tissues near the cicatrice.

As to aseptic surgery, I can only say that if anyone has been taught the modern methods and neglects them, and death occurs from erysipelas, pyæmia, or septic complication, he cannot be held irresponsible.

ACUTE UNILATERAL OPTIC NEURITIS,

WITH THE REPORT OF A CASE.

By G. E. DE SCHWEINITZ, M.D.,

OPHTHALMIC SURGEON TO THE PHILADELPHIA AND CHILDREN'S HOSPITAL AND TO THE
INFIRMARY FOR NERVOUS DISEASES.

[Read October 10, 1888.]

CASES of sudden failure of sight in one eye with little or no ophthalmoscopic changes are occasionally encountered, in which the attack is attributed to exposure to cold. Sometimes in these instances congestion of the optic disk is present, and a retro-ocular neuritis has taken place. Other cases of acute optic neuritis, sometimes monocular, sometimes double, are on record. Thus Max Haadel¹ observed nine cases, some single and some double, with and without defects in the field of vision, usually with serious disturbance of sight, mostly with pronounced inflammation of the papilla and neighboring retina, in which exposure to a draught of air was the imputed cause. Periostitis at the foramen opticum was doubtful, and the absence of syphilis, sugar and albumin, lead and other poisons was assured in every case. In M. Schlüter's² statistics, among thirty-eight cases of neuritis and neuro-retinitis, seven are classed as primary, while the remainder are arranged as follows: thirteen of central origin, six from specific causes, four followed as the result of pathological orbital processes, two from abuse of alcohol and tobacco, two from albumin, and one each in connection with the puerperal state, after injury, from acute myelitis, and from hereditary reasons. E. Schmidt,³ in an examination of the cases of optic neuritis in the clinic of Prof. Hirschmann, at Charkow, found, among 120 cases in which the etiology was recorded with some degree of exactness, two instances of papillitis

¹ Max Haadel, Inaug. Diss., Berlin, 1885. Abst. Centralbl. f. Prakt. Augenheilk., p. 223, 1885.

² Schlüter, Inaug. Diss., Berlin, 1881. Abst. Nagel's Jahresbericht, xii. Jahrgang, p. 306.

³ Schmidt, Wjestnik Ophth., 1885, p. 273. Archives of Ophthalmology, vol. xv. p. 249.

or papillo-retinitis due to cold. Voissius¹ has recorded a case of monocular optic neuritis in a man aged sixty-one, the attack coming on as the result of catching cold during a long wet drive. Recovery, with a hemiopic defect in the field of vision, was the outcome of the disorder. Roi² reports some examples of optic neuritis which he looked upon as rheumatic. They appeared monocular, were accompanied by a speedy diminution of visual acuity passing into amaurosis, but not, however, to the exclusion of a return to normal sharpness of sight. H. F. Hansell³ describes two instances of acute optic neuritis of rheumatic origin, one monocular in a healthy married woman, and the other double in a man aged thirty-one. In each there was sudden loss of vision, swollen optic disks, and under treatment a rapid return to normal visual acuity. In Dr. Hansell's paper references to analogous cases are recorded, and L. W. Fox⁴ has recorded an instance of acute monocular optic neuritis. Recently R. H. Derby⁵ has reported a case of unocular neuro-retinitis in a girl whose father had had syphilis, but who had no other manifestation of constitutional taint. There was at first a central scotoma, then optic neuritis. Light-perception was lost, but under mercurial inunctions and iodide of potash the swelling of the disk, which had amounted to 7 D., subsided, and fair vision was recovered. Cases of optic neuritis without evident cause are occasionally recorded, as one by Power.⁶ The patient was an anæmic lad of seventeen; the neuritis was double; albumin and syphilis were absent; the lad had had two attacks of rheumatism and his father was gouty. Friedenwald⁷ describes an instance of right optic neuritis in an otherwise healthy girl of fourteen, preceded by violent headache and other symptoms indicating grave cerebral disturbance, but in which perfect recovery followed. He classed her case with these examples of optic neuritis, referred to by Juler, occasionally met with in young girls, the cause assigned being some menstrual disturbance, the presence of which, however, careful inquiry often fails to elicit. Usually the neuritis is preceded by severe headache and the prognosis is unfavorable. No further reference to the many cases of neuro-retinitis described in connection with irregularities of the menstrual functions need be made. Hirsch-

¹ Voissius, *Klin. Monatsbl. f. Augenheilk.*, xxi. p. 298.

² Roi, *De la névrite optique rhumatismale*, Paris, 1886.

³ H. F. Hansell, *Med. News*, Aug. 7, 1886.

⁴ L. W. Fox, *Amer. Journ. of Ophthalmology*, July, 1884.

⁵ *Amer. Oph. Med. Soc.*, 1888. *N. Y. Med. Journ.*, Oct. 6, 1888.

⁶ Power, *Trans. Oph. Soc. U. King.*, vi. pp. 361-368, 1886.

⁷ A. Friedenwald, *N. Y. Med. Journal*, Feb. 5, 1887.

berg¹ has seen several instances of primary optic neuritis, whose course is very typical. The disease is divided into three stages: the first, characterized by great visual disturbance, with slight ophthalmoscopic appearances; the second, by diminution of the visual disturbance and very marked inflammation of the disk; and the third, usually by almost complete recovery with pallor of the disk. The cases mostly occur in women, but are not connected with derangement of the sexual functions. Partaking somewhat of the nature of such cases, but not without a history of exposure as the exciting cause, is the subject of this communication.

Mrs. W., aged forty, consulted me on July 11, 1888, because for a week past she had suffered from neuralgic pains in and above the eyes, most marked upon the right side. Bright light was distressing and pain followed when the eyes were rolled upward; slight tenderness was apparent when pressure was made upon the right globe. The vision in each eye was $\frac{5}{VIIIT}$, the ampli-

tude of accommodation 3.5 D.; there was high insufficiency of the internal recti, so that a divergent squint was evident when the eyes attempted to fix a point 15 cm. distant. The fundus of each revealed no gross lesions, save a slight retinal haze around the upper and lower edges of the right disk, the deeper layers of which were gray. The maculas were normal and the refraction appeared to be a simple hypermetropia of 1.5 D. In the absence of any general derangement the peri-orbital pain was attributed to eye-strain, and atropia drops were ordered for the purpose of measuring the refraction error.

The correcting glass proved to be + 1.5 s. and with it normal vision ($\frac{5}{V}$)

was acquired. During the application of the atropia the neuralgia disappeared. The drops were discontinued and the patient directed to return in two weeks. During the measurement of the refractive error, the patient, on several occasions stated that although she saw the same number of letters with the right eye that she did with the left, she failed to see them with the same distinctness; but no changes at this time were present in the fundus. This indistinctness gradually assumed the appearance of a definite, dark area in the field of vision, the peri-orbital pain returned, and five days after the last ophthalmoscopic examination had failed to discover any changes in the disk or retina, she returned with the vision sunken to ability to count fingers and well-marked right-sided optic neuritis. All edges of the disk were woolly and its upper margins entirely hidden, while a flame-shaped hemorrhage was situated above and to the inner side. The apex of the swelling was +3 D., the vessels were about normal in size, and the macula free from disease. The pupil was of medium size and acted sluggishly to light and shade. A few days before this time she had gone on an excursion with her children, became much overheated, and had afterward waded about in a neighboring brook. It was in the evening of this day that the neuralgia

¹ Hirschberg, Centralbl. für Prakt. Augenheilk., Nov. 1887.

returned, the definite dark area appeared in the field of vision, and shooting pains attacked the deep muscles of the thighs. Further examination proved an entire absence of any symptoms pointing to brain disorder; the heart and lungs were normal and the patient was not anæmic, there had been no suppression of the menstrual flow and this function was natural, no active uterine disease existed, except a slight prolapsus which was not then under treatment. The urine was free from albumin, sugar, and tube casts, and the last recent illness, several years before, had been an attack of peritonitis from which a good recovery had resulted. Dr. James Tyson, who saw the case in consultation, confirmed the accuracy of these examinations. Syphilitic infection and the action of lead or other poisons were carefully excluded. The vision continued to sink, and on the following day was reduced to faint quantitative light-perception and the disk, if anything, was slightly more swollen. The temple was freely leeches and the patient directed to take fifteen grains of salicylate of sodium before each meal, and seven and a-half grains of iodide of potash, with one-twenty-fourth of a grain of bichloride of mercury after each meal. Three days later, or on July 30th, the vision was slightly improved to the ability to see the hand move and the pain was distinctly better. The medicine was continued and small fly blisters ordered placed upon the temple. August 1st, the salicylate of sodium was discontinued, but the other medication continued, vision improved and large letters (Sn CC) were faintly recognized. August 6th, marked improvement, $V. = \frac{5}{xxxv}$; edges of the disk visible all around and only a faint remnant of the hemorrhage. August 20th, neuritis had practically subsided; $V. = \frac{5}{x}$, form and color fields normal in extent; no scotomata; ordered one-twenty-fourth of bichloride of mercury after each meal. September 9th, $V. = \frac{5}{viii}$, disk pallid, and all traces of the neuritis had disappeared.

In the absence of any symptoms pointing to cerebral disturbance, with no uterine disease save a slight prolapsus and the history of a leucorrhœa no longer active; with the menstrual functions normal; with a healthy circulatory apparatus and the urine free from albumen, sugar, and tube casts, and with the direct account of overheating and exposure, we may fairly conclude that this was an instance of genuine, acute optic neuritis. The history shows that before any ophthalmoscopic changes were evident, and before there was any positive diminution in visual acuity, the field of vision was invested with a haze which afterward assumed a definite, dark form, probably coincident with the first appearance of the inflammation around the papilla and the loss of sight. Hence it is evident that the attack was in process of formation and was precipitated by the wetting of the feet and sudden cooling after an overheating. Cases of optic neuritis apparently due to exposure, as has been pointed out by Leber and others, are mostly monocular; and rheumatism, perhaps upon insufficient evidence, has

been cited as the cause. Gowers,¹ writing upon this point, says: "Neuro-retinitis has been loosely ascribed to rheumatism, but only on the ground that it has sometimes appeared to be due to cold." Rheumatic inflammation at the back of the orbit, however, according to the same author, may damage the optic nerve. Michel,² commenting upon a reported case of acute, peripheral retro-bulbar neuritis, remarks that he has never observed a "rheumatic" neuritis and considers the assertion of such as a mark of ignorance of the causes especially operative in the production of inflammation of the optic nerve.

Hansell (*loc. cit*) thinks "that a true rheumatic inflammation of the fibrous coat of the nerve between the optic foramen and the sclerotic" quite possible, but owing to the infrequent opportunity for section and examination admits that "our pathology is, at best, speculative." The central scotoma which existed in this and similar cases denotes an affection of the sheath of the nerve extending into its substance, not, as Hirschberg remarks, as would have been supposed before the macular fibres were discovered, a central inflammation extending outward. The prognosis depends to a certain extent upon the site of the lesion and the termination may be favorable, as in the case reported, or a permanent atrophy of the disk may result. Hirschberg (*loc. cit*), in his cases of primary optic neuritis, has found usually that the second eye is attacked; the interval may be days, or weeks, or months. Three of his cases illustrate this fact. A woman, aged forty-two, suddenly lost the sight of the right eye; in six days from the beginning of the attack this was well, but the left eye was attacked and optic neuritis developed; in three weeks recovery had taken place and the fundi were normal. In a second case a woman, aged twenty, had slight temporary loss of vision in the right eye three weeks before coming under observation for loss of vision in the left, which came on eight days before. Four months later she came with the right eye similarly affected, while the left had practically recovered. A third instance was that of a peasant girl, aged seventeen, who had her right eye attacked in 1878, recovered, and in 1884 had her left eye attacked, which also recovered.

The treatment has already been discussed. Leeching of the temple, followed by blisters, diaphoresis, together with the salicylates and iodide of potash, yield the best results. Improvement may take place before the remedies have time to take effect.

¹ Medical Ophthalmoscopy, 2d. ed. p. 230.

² Nagel's Jahresbericht, xvii. Jahrgang, p. 381.

DISCUSSION.

DR. RANDALL: I can add nothing to Dr. de Schweinitz's admirable presentation of the subject; but would like to reiterate the importance of early recognition and prompt treatment of such cases. I feel very sure that the issue depends very largely upon whether early alterative treatment is instituted, since upon the limitation and prompt removal of the exudation in the nerve and retina depends the possibility of a return to the normal with preservation of the sight.

MORTON OPHTHALMOSCOPE.

By JAMES K. YOUNG, M.D.

[Exhibited October 10, 1888.]

THE Morton ophthalmoscope presents some new features which may be of interest to some of the members of this Society. It is made by Pickard & Curry, London, and, as an instrument, is well balanced, fits the eye well, and as a piece of mechanism is perfection itself. It is a modification of the Gower's ophthalmoscope, as are all modern English instruments, but in the position and movement of the lenses differs from this and all others. The Rekoss disk is there replaced by an elliptical trough containing the lenses. These are simply confined in the channel, are unattached to each other, and are moved by a wheel below, and pass around a wheel above.

In this respect it resembles the Couper instrument, in which the lenses are attached to one another as an endless chain, but is an improvement in the right direction. It has, in all, thirty-three lenses. In the trough are eighteen concave lenses from -0.5 to 30 D. Eleven convex lenses from $+0.5$ to 12 D., and on the disk has four additional lenses, a -10 D. and -50 D., and a $+0.5$ and $+20$ D. These admit of as many combinations as any instrument I am familiar with.

It has three mirrors, a small concave mirror of about 6 cm. focal length, fastened to a collar, a large concave mirror of about 29 cm. focal length, and a plane one.

These are all attached, and the apertures come readily over the sight-hole. It has below the index dial a pupillometer, which adds to the usefulness of the instrument.

It fits accurately into a rosewood case, and has a convex lens for the indirect method.

DISCUSSION.

DR. RANDALL: I feel that a discussion of minutiae as to the ophthalmoscope is hardly in place; but as to the point emphasized, that the instrument contains a concave lens of fifty dioptries, I must confess my scepticism as to its value. Cooper put a concave 72 D. in his instrument and told me that I was self-condemned as an ophthalmoscopist in having nothing stronger than 24 D.; yet when asked if he ever had use for the strong lens, admitted that a case calling for it was seen but once or twice a year. Even should one of the very rare cases of high myopia be met, the eye-ground would be better seen (if at all visible in the upright image) by placing a strong concave lens close in front of the examined eye.

SOME RESULTS OF EXCESSIVE CONSERVATISM IN THE TREATMENT OF DISEASES IN LARGE JOINTS.

By ADDINELL HEWSON, A.M., M.D.

[Read October 24, 1888.]

THESE results were presented in consequence of the fresh interest in the subject created by Dr. John Ashhurst, Jr., in his recent "Contribution to the Study of Excision of the Large Joints," and its discussion before the American Surgical Association at Washington, D. C. Reported in the *Journal of the American Medical Association*, September 29, 1888.

Dr. Hewson exhibited three cases, as representative of the results of his treatment of such diseases during the last twenty years, which has been with "earth dressings" as their essential element. These three belong to a group of recent date in which he had also been using *topical* applications at intervals, of the gases proposed by Bergeon for the treatment of phthisis pulmonalis per rectum, and in which he had likewise applied localized galvanism as well as forced flexion to complete the cure.

CASE I. was of disease of the left hip-joint, with one and a half inches shortening; no suppuration. Cure complete without any shortening, deformity, or lameness.

CASE II. was of disease of the left wrist-joint, with suppuration, two fistulæ, loss of power of motion in all joints beyond the elbow. Treatment at time of exhibition, of six weeks' duration, with decided dissipation, of disease and recovery of functions of all the joints involved.

CASE III. was of disease of the elbow-joint of two years' duration, preceded by relapse from typhoid fever, with suppuration, seven fistulæ, necrosis, and rigid ankylosis. Cured, with recovery of functions of the joint and power of the limb.

The penetration of the sulphuretted hydrogen into the system and its elimination through the skin, was demonstrated in all these cases

to occur when the gas was applied to the tegumentary coverings of the diseased joints by means of an inverted funnel, or a gum bag, by the aid of bibulous paper saturated with acetate of lead and laid, after being freshly wet, on the surface of some remote part of the body, as the *alæ nasi*, side of the neck, axilla, palm of sound hand, groin, back of the knee, ankle, etc.

TREATMENT OF PERITONITIS.

By J. M. BALDY, M.D.

[Read November 7, 1888.]

I PRESENT this brief paper to you to-night, not because I have anything particularly new to offer, either in the line of pathology or in that of treatment, but that a full discussion of this most interesting and important subject may perchance be drawn out. The points as I shall present them here are, I know, considered somewhat radical from a medical point of view; but they are views toward which surgeons are gradually drawing nearer and nearer, and of which actual experience is daily demonstrating the value.

Peritonitis arises, as you are well aware, from a vast variety of pathological conditions, and in dealing with it, the origin of the inflammation must always be taken into consideration. The plan of immediately putting every case of this disease on the opium treatment is departed, and, nowadays, no one would think of pursuing such a course in a peritonitis following rupture of an abscess, for instance, provided an abscess was known to have ruptured; nor in the case of a penetrating wound of any of the hollow viscera, with extravasation of their contents into the peritoneal cavity. The first thing to be established when called to a patient suffering with peritonitis, is the cause of the trouble. This is not by any means an easy thing to do. A case may present all the symptoms of peritonitis, and, on close examination, an inguinal hernia be found. The temptation here is immediately to set this down as the cause, and proceed accordingly, especially if the hernial mass is tender, and presents other symptoms of excitation, where before it had been quiescent. In such a case one may readily be misled, as has happened to myself, and the real cause found to be something else. Again, although the books lay down most beautiful rules for diagnosing the different varieties of intestinal obstruction, it is often impossible to say more, than that there is a probable mechanical obstruction of some kind or other, somewhere in

the abdomen; but even then one cannot be sure that the obstruction is caused by the peritonitis and not the peritonitis by the obstruction. I have seen peritonitis in cases where, on examination, it was not at all certain that the pelvic contents were at fault, and yet an operation has developed the correctness of that hypothesis. One could go on indefinitely multiplying instances of mistakes of this kind, and mistakes which are perfectly justifiable in the majority of cases. It is simply impossible in a large number of instances to do more than guess at the real cause. But although we cannot always detect from a mere examination of a patient the cause of the trouble, it does not follow by any means that the disease has arisen idiopathically. The more I see of peritonitis, the closer and closer am I inclined to draw the line at the idea of an idiopathic origin. I am not yet quite ready to deny the existence of such an origin altogether, but as our knowledge of intra-abdominal troubles has grown, just so steadily has idiopathic peritonitis diminished in frequency.

On the other hand, cases of peritonitis are constantly falling into our hands in which the diagnosis is comparatively easy, and then I think the indications for treatment are plain; while the exact condition of affairs remains in doubt, the best of men may hesitate, and often their hesitation is responsible for the unfortunate ending. Once, however, given a correct diagnosis, there should be no hesitation as to the course to pursue.

To begin with, I must unhesitatingly condemn the use of opium in any of its forms. I think the use of this form of drug in these diseases tends rather to increase the trouble than to diminish it; at any rate, if it does not do damage *per se*, it certainly puts the parts in an excellent condition to continue on in the course in which they have started, and blinds us to the damage being done. In a paper read before the Obstetrical Society last November, on "The Use of Salines in Peritonitis after Laparotomy," I dealt with the use of this drug quite extensively, and my convictions then stated have been constantly confirmed and strengthened, not only in peritonitis following operation, but in peritonitis from all causes. I may quote the following from that paper:

"Heretofore I have treated cases of peritonitis on the opium plan. In one case I gradually increased the dose of the tincture of opium until the patient received in one day between sixty and seventy grains of the drug. I have never been satisfied with the results of this kind of treatment, nor have I been able to convince myself that it was even logical. We are taught that opium 'puts the bowels in splints,' and in this manner keeps the peritoneal surfaces

from rubbing together and increasing the inflammation. But the bowels are already in splints, as it were, and any one trying to make them move will be quickly convinced of this fact; therefore, for this purpose opium is superfluous. The drug relieves the pain, it is true, but oftentimes it does not even do this, excepting in enormous doses. Relief of pain is practically all that opium can do for good, in peritonitis. It, however, does a world of harm; it helps to keep the bowels in splints and so favors the formation of those great masses of adherent intestine which we so often find the cause of subsequent intestinal obstruction; also, the formation of numerous bands of organized lymph which as often bring a patient to grief, in after years; still worse, it closes, by paralyzing all the excretory organs, all the avenues of escape for the poisonous products of inflammation formed in that great lymph-sac, and in this manner supplies material, the best possible, for keeping up and spreading the inflammation, much more surely than the rubbing together of the parietal and visceral peritoneum will."

It also almost invariably causes tympanites, with all the accompanying dangers of over-distention, and, as has happened, death from cardiac paralysis. And, further, I may say that this drug lures us into a false sense of security, and benumbs all our desires to make any further effort in our patient's behalf. The pain and tenderness being relieved, and the sufferer being made comparatively comfortable, we stand by and wait, our waiting as often leading us to the coffin as not, without our even suspecting that our patient is worse. After having stupefied and benumbed the patient, a consultant is perchance called in to the case, only to find his hands tied, by having all the symptoms masked, and with no possible way of knowing what progress the disease is making, but by a surgical procedure, and that, in view of the fact that the patient *seems* better, he dare not propose.

In great contrast to this picture, stand the results of the use of salines. Here the bowels are put into active peristaltic action; this motion tends to prevent the formation of adhesions and bands; the peritoneal cavity is drained of the products of inflammation; the inflamed surfaces are relieved of all engorgement, by a thorough depletion of the vessels in the intestinal walls; the inflammation is most effectually stopped; the pulse and temperature almost immediately improve, and the pain is relieved as quickly as can be by the use of opium. This, theoretically, may seem strange, but nevertheless it is a clinical fact.

While writing this paper I was called to a woman sixty years of age. Her knees were drawn up; her abdomen was greatly swollen and tympanitic; the pain was excruciating, and she could not tolerate any manipulation whatever of the belly-wall; her temperature was elevated and her pulse quick; an anxious expression of the face and vomiting were present. The cause of the attack could not be detected,

probably only because she could not be handled properly for an examination. Salines were administered, and in much less than fifteen hours the belly-walls were shrunken and flabby, permitting of free manipulation, with hardly any evidence of pain; vomiting had ceased; pulse and temperature were both in good condition, and, in fact, all the symptoms were rapidly disappearing. She had passed a most comfortable night, sleeping almost the whole of it. In twenty-four hours more I had discharged the patient, simply with instructions to keep her in bed for a few days longer, and feed her well, in order that she might regain the strength she had lost. I may add that the case had appeared so bad when first seen, that I had notified my nurse to be ready for a possible operation the next day. This same result has followed this treatment so often, and so constantly in my hands that I have come to look for it with certainty, as soon as the bowels can be made to act. Of course, should we suspect that a strangulated hernia was at the root of the trouble, or that there was pus in the peritoneal cavity, or that the intestines were obstructed by an organic lesion at any point, we would not think of resorting to purgation, but would immediately turn to our surgical resources.

The sources of a peritoneal inflammation are so numerous, it would be useless to attempt to enumerate them further; but the general rule might, I think, be safely laid down, that where it could be demonstrated that the disease was caused by an organic lesion, abdominal section was indicated, and that in addition those other cases which refused speedily to yield to purgative treatment, should be immediately dealt with in the same manner. When a pus sac is known to be at the bottom of the trouble, or an appendicitis is in existence, it is folly to fool with drugs of any kind; and where drugs are used and relief does not quickly follow, whether the cause is known or not, it is equally unwise to delay longer. The source of the disease once removed, the peritonitis will rapidly disappear. Cases reported in the journals are constantly demonstrating the worthlessness of all medical interference, and are steadily pointing to the fact that peritonitis is preëminently a surgical disease, and should not be intrusted in the hands of a purely medical man, but should be always and at once turned over to the surgeon. An article by Mr. Tait, in a recent number of the *Annals of Gynecology*, sets this forth in flaming colors. The very first case reported by him was one of purulent peritonitis, which had been tinkered with, until even the operation he performed was too late to save the woman. An abdomen containing pus, either encysted or free in the cavity, whether produced by puerperal disease or any other, demands opening and removal of that pus

from wherever found. If there is not active peritonitis present, the person afflicted is liable at any minute to be so attacked. This fact does not seem to be sufficiently understood, and physicians are constantly treating pelvic abscess with local applications, electricity, etc., sometimes suspecting the true condition, at others, mistaking it for some other condition, such as tubal pregnancy, for instance, as has been done lately by one of the most prominent advocates of the electrical treatment for extra-uterine pregnancy, in this country. Where an intestinal obstruction, an appendicitis, an inflamed tubal condition, a penetrating wound of any of the viscera, a tumor, or any of a dozen other troubles are found, they should be dealt with according to our present surgical light. In such cases as these, peritonitis is not a disease, but merely a symptom, and when the original cause is removed the trouble subsides at once. Often the mere opening of the abdomen, together with irrigation and drainage, is sufficient. This seems especially to be true of those cases of tubercular peritonitis, so many of which have lately been springing up, and to which I called your attention in my paper on "Exploratory Laparotomy" last spring. Then I was able to show that six deaths from various causes had taken place out of thirty-six, collected in Germany, and only one death out of seventeen cases which I had collected in this country. This death was due, not to the operation itself, but to defects in the details of the operation. In all these cases irrigation or drainage, or both, followed the operation, and seemed all that was needed to effect a permanent cure. It is useless to take up your time by quoting cases—the literature is teeming with them, and almost every journal picked up contains a lesson.

To sum up the conclusions of this brief paper, I should say that when called to attend a patient suffering with peritonitis, we should first determine the cause, and if it is found to be an organic one, the immediate use of the knife, followed by irrigation and drainage, is the only proper method of procedure.

Should the cause be found to be functional, the use of purgatives, followed, if necessary, by enemata, are indicated; and these failing to relieve quickly, surgical measures should soon follow.

If the case is of doubtful character, I would be inclined to try the purgatives first, and stand ready to interfere with the knife at a moment's notice.

Of course, it is impossible to lay down any absolute general rules for the treatment of every case, as each and every one must be a study of itself; and yet, as nearly as such rules can be laid down, the above seem to me to be the proper ones.

THE TREATMENT OF PERITONITIS.

By ARTHUR V. MEIGS, M.D.

[Read November 7, 1888.]

THE question how to treat peritonitis is one of the greatest importance, and upon the decision eventually reached will in the future depend the lives of many patients. Should the leaders of our profession decide that the administration of saline purges is the best treatment, and this be for a few years taught in the schools, the ordinary practitioner will soon acquiesce. If such a consummation is to be deplored, now is the time for us who are of the contrary way of thinking, to protest.

To me it seems clear that before any conclusion can be reached, it must first be acknowledged that peritonitis, as ordinarily seen, diagnosed, and treated by physicians, is so different from the lesion or disease which has been successfully dealt with by surgeons by the administration of saline purges, that it must be recognized that, from the standpoint of therapeutics, the two questions are as far apart as though there were two widely differing diseases.

As a therapeutic measure, no one disputes the wisdom, under some circumstances, of making an attempt to abort an inflammation; and yet it is equally well known that such an attempt, when made after the inflammation has progressed so far that to abort it has become impossible, must not only fail, but equally certainly will be productive of positive harm. It is a common rule of treatment, and one that holds good in the great majority of instances, that an irritated, sore, or inflamed part is to be put as nearly as possible at rest, and that whatever increases the pain suffered is likely to be injurious. Why shall we make an exception to this rule in all cases of peritonitis by giving salines, which throw the bowels into a state of great activity, and increase the pain, at the same time denying the patient opium, which equally certainly relieves?

I have been, and am an advocate of the use of opium in all cases of peri-

tonitis as seen by physicians, but at the same time I have never denied my patients the use of laxative medicine, and it is, I am sure, by the judicious administration, according to the special needs of each particular case, of the two seemingly diametrically opposed drugs that the best results will be attained. The reason, probably, that the use of opium in the disease is being decried is that it has been abused. It should not be given to the point of narcosis, nor should it be expected that in cases of severe peritonitis the pain will be abolished. Measurable relief only should be looked for, with alleviation of the terrible colicky pains so characteristic of the disease in its full development. I have never been a believer in the treatment by the use of anodynes exclusively, and think it absurd to talk—as I have heard—of purging the patient by the use of opium and belladonna. If we had six months in which to work, and could first establish the opium habit in the patient, we might, perhaps, encourage diarrhoea, or at least not interfere with it, by the administration of opium. In a disease, however, which lasts usually but a few weeks at the very outside, such an expectation can end but in disappointment. The treatment that will give the best results, according to my view, is the following: in all cases in which no physical obstruction can be diagnosticated, for which operation must be at once recommended, and this should include doubtful cases in which operation may subsequently become necessary, there should be prescribed liquid diet, small quantities every two hours, and every two hours a quarter of a grain of opium, and one-twelfth of a grain of extract of belladonna. To this may be added, if it should seem advisable on account of pain, the administration twice, or, at the outside, four times in twenty-four hours, a one grain powdered opium suppository. At the same time injections of warm water, with or without soap, should be given once to three or four times daily. If flatus is passed, the case continues to be a very hopeful one. This course should be rigidly adhered to for from twenty-four hours to five days, or possibly longer, when the time will have arrived at which it becomes necessary to consider the propriety of using some sort of aperient.

Purgatives are given in peritonitis for two distinct purposes: first, to increase the peristalsis, and thus overcome obstruction; and, second, to induce large watery movements, for the purpose of directly depleting the abdominal, and especially the intestinal, bloodvessels. After operations, inflammation in greater or less degree is so common, and we are so well aware that it is liable to occur, as to be always prepared to meet it. This being the case, it may be met in its very incipency,

and if inflammation can ever be aborted, it is under such circumstances. The explanation of the success, therefore, of surgeons in treating peritonitis with large doses of saline purgatives would seem an easy one, for they deal with a stage of the disease which never comes under the management of physicians, as people in the early stages of the disease do not seek advice, and, besides, if they did, the differential diagnosis between idiopathic peritonitis in its earliest stage and enteritis or mere intestinal irritation would be an impossible one. No one, I think, should deny surgeons the credit their courage deserves for having instituted this revolutionary method of treatment, for, measured by our old standards, it is revolutionary, but at the same time we must not err upon the other side, and with undue haste conclude that the method is applicable to all cases. I have long been of the opinion that the old surgical practice of shutting up the bowels for a week, with opium, after an operation for hemorrhoids, was a bad method.

Having, then, quieted our patient somewhat during the first few days of attendance, with injections and liquid food, and belladonna and opium, and at the same time been very careful not to induce narcosis, or in the least to depress the respiratory forces, for, if we do, the remedy will be worse than the original disease: we must, as already said, consider the propriety of getting the bowels moved. The decision in regard to the precise moment at which this attempt is to be made is, in my opinion, one of the most delicate questions that can arise in therapeutics, and gives to each of us, when we meet it, an opportunity to show a real genius for the treatment of disease. The medicine, however, which shall be given is very easy to decide upon—here there is no inflammation in its early stage, and, therefore, there can be no question of aborting it. Salines could only act upon the bowels like other drugs, relieving tension, if you like, by abstracting water directly from the intestinal bloodvessels; but, so far as the mere moving of the bowels is concerned, they are by no means so effective, or, as the laity call it, “searching,” in their action as some of the vegetable purgatives. Any one who has been called upon to treat cases of fecal accumulation (a paper upon this subject was published some years ago by the speaker, in the *Transactions of the College of Physicians of Philadelphia*), will have learned how useless and ineffective are salines if the bowels are very sluggish, while small and repeated doses of vegetable purgatives are perfectly satisfactory and certain in their effects. In such cases salines, and even castor oil, will induce large watery stools, but no fecal matter is brought away, and it

seems as though the fluid material had come from below the accumulated feces, or came by, and the patient is no better off than before, though probably he will have suffered much pain. No better combination can be given than a pill consisting of a twelfth of a grain of extract of belladonna, a quarter of a grain of extract of nux vomica, a quarter or an eighth of powdered aloes, and a half or one grain of rhubarb. This should be given at first once or twice in twenty-four hours, and, if violent pain be set up—which, however, seldom happens—it should be stopped, and the opium and belladonna every two hours used again for a day or two, when the attempt with the aperient may again be made. After a day or two the pill may often be given every four hours, and I have often seen the obstruction give way under this treatment, and the patient entirely recover.

It would be most unfortunate, it seems to me, for the science of medicine, and still more so for those who in the future are to suffer with peritonitis, if the treatment of the disease with sedatives should be entirely abandoned, as has been recommended here this evening. Let us look at the question reasonably, and without prejudice, and in the future assign to one class of patients operation by a competent surgeon, and saline purgatives afterward, if those skilled from a study of the subject in that particular direction judge that to be the proper course; and to the other, a reasonable use of anodynes and injections, with moderate doses of vegetable laxatives when the time comes for their administration. Because, in the past, the sedative method of treatment has been abused, and patients have been hurried out of the world by the unwise management of incompetent physicians who have narcotized them, is no reason why we should cast aside what is good in the method, any more than it would be wise for us now to assume that, because the administration of saline purges is advisable in the surgical treatment of some cases, it is, therefore, to be looked upon as a panacea in the disease, and the treatment to be recommended in all cases.

For my own part, I am a firm believer that the disease may arise idiopathically, and, when I say this, I mean from an attack of enteritis or violent indigestion, or from chilling of the body, just as I believe pleurisy may arise, and, in such cases, it is reasonable to suppose that the inflammation very soon becomes more or less generalized, though, of course, it must have had its origin at some point. Such cases as these, if it be conceded that they ever arise, are not amenable to surgical treatment, for there is no point of special obstruction, and operation could not effect any good, unless by merely cleansing.

In conclusion, I cannot, perhaps, better emphasize the correctness of the statement that the treatment by sedatives should not be abandoned in all cases of peritonitis, than by calling your attention to the fact that in many cases in the past, and the same thing is certain to occur again in the future, post-mortem examination has demonstrated that the disease was so extensive, or of such a nature as to be necessarily incurable. Under such circumstances, I think, no one will dispute that the province of the physician is to do what he can to soothe pain, and make the last days and hours of the patient as endurable as circumstances permit, and no other one drug will conduce so much toward this end as opium.

DISCUSSION.

DR. J. H. MUSSER: I have but little if anything to add to the able remarks of the gentlemen who preceded me, unless it be my own personal experience. While interested, and in a measure agreeing with the remarks of Dr. Baldy, yet, as a medical man, I must largely agree with the conservative views of Dr. Meigs. In one respect, however, I beg leave to differ, and I believe that cases of idiopathic or so-called functional (?) peritonitis must be very rare, for in the course of a tolerably large experience I have not met with any; but, on the other hand, have had frequent cases that originated from some local cause. Indeed, it is my belief that in every instance almost, some disease, acute or chronic, in the intestinal tract, or disease of the organs covered by the peritoneum, is the cause of inflammation of that membrane, apart from septic or microbic causes. A successful treatment of all cases, therefore, must depend, in the first place, upon the recognition of the many antecedent pathological conditions that may be considered as causal. A large majority of the cases that I have seen got well without resorting to surgical measures. In these instances a similar plan of treatment to that suggested by Dr. Meigs was to a certain extent carried out, notwithstanding the fact that a local or a focal origin, if you please, of peritonitis could always be determined, and the general and local medical treatment will often either prevent, or at least counteract the deleterious effects of a general inflammation, as before intimated. The plan of treatment which I have carried out in most of the cases has been rather simple, beginning in the first place with local depletory measures either by blister or by local depletion with leeches, not fearing the depressing effects of local depletion, but rather encouraging further bleeding than otherwise, following the depletion by poultices, and possibly by general stimulating applications, such as turpentine. At the same time I endeavor to open the bowels as early as possible, and while on the one hand vegetable cathartics are of service, yet to me, on account generally of the excessive vomiting, some mercurial has usually been preferred. I use principally, if vomiting is present or not, calomel in doses of one-twelfth, one-eighth, or

one-fourth of a grain every hour or half hour, until the desired effect is produced, and, in addition to the purgative effect, I am, indeed, not disturbed if I can get a constitutional effect of the drug also, for, as you well know, its antiphlogistic effects in peritonitis are undoubted. With regard to opium, I use it simply to relieve pain, and hence in the smallest doses possible. I prefer the hypodermic injection of morphia, and it is surprising frequently what small doses are sufficient to give comfort. Sometimes an eighth or a sixteenth of a grain, twice daily, will suffice. In addition to the anodyne effects of the drug, its stimulating effect is, of course, of service, and after the mercurial has acted on the bowels I combine the extract of opium with the drug, giving the opium more frequently, and the mercury less. Usually I use atropia with the morphia and in this way counteract the depressing effects of the opiate. Stimulants are worthy of mention. I begin their use early, and, indeed, from the first twenty-four hours in some cases permit it as the only kind of food administered until all danger is past. I give it early in order to avert or to mitigate the stage of collapse which is likely to ensue. With this general plan of treatment, bleeding, moderate purgation, opium to relieve pain, and the use of stimulants, my patients have usually recovered. I may very often endeavor to give in some way quinine, preferably by suppositories.

Patients die of peritonitis generally, not because its management is not understood, but because it is not recognized sufficiently early. Hasty examinations without due regard to the local origin of the symptoms of the disease—and of these pain is usually the earliest—cause one frequently to overlook the actual condition of the case. Two cases I have seen lately, one in consultation, another at the autopsy, illustrate this. They were both cases of peri-cæcal abscess. In the one instance the patient was ill for four or five days prior to my visit. Prior to the last twenty-four hours he visited the physician's office, simply complaining of recurring attacks of sharp abdominal pains, which were attended with a moderate amount of diarrhœa. The physician looked upon it as a case of cholera morbus, and treated it accordingly. The day of his death the patient did not leave his bed, but was visited by the physician, who was horrified to find him in collapse. Unable to recognize the cause of collapse, not even suspecting that death was imminent, he asked me to see the patient. The thready pulse, the persistent watery vomiting or regurgitation of fluid, the cold sweat and the cold extremities, the tympany and the rigid abdominal muscles, told the tale more plainly than his words, and an area of dulness in the right iliac fossa, with faint local swelling and tenderness, pointed to the appendix as the probable source of the inflammation. Death ensued a short time afterward, and at the autopsy a most extensive peritonitis, secondary to rupture of the vermiform appendix and peri-cæcal abscess, was found. In the other instance the patient, a lad sixteen years old, was seen by the physician at six in the evening. In the hurry of his work he neglected the minute examination which he usually bestowed upon them, and prescribed for what he thought was a colic, induced by indigestion, which colicky pains had been going on for two or three days, the patient, however, being out most of the time. He saw him later in the evening, much improved, apparently, from the effects of opium, so often misleading because it masks symptoms, and was shocked to hear the next morning that at six o'clock his patient had died in collapse. In this case foreign bodies in the appendix had

caused the usual rupture, with peritonitis and death. So, too, peritonitis arises, as you know, after inflammation of the tubes or ovaries, after disease of the biliary passages, and after other instances of local disease.

The most difficult question for the physician to decide, and the one that has always been the most serious in my mind, next to the grave question of when to open the bowels, is when to ask the surgeon's help. Given a case with a palpable tumor, with local oedema, the fever, the vomiting, and the general tenderness indicating a general inflammation, and the question is an easy one to decide. On the other hand, the tumor being obscure, possibly only an area of dulness outlines it; the symptoms, however, becoming threatening, shall we then ask for help? I always do, of course, when in doubt; but I am fixed in my mind to have surgical aid and instruct the family to that effect when persistent vomiting continues, when the night-sweats become marked, and when tympany and bowel obstruction are decided. Indeed, after the second night-sweat, even if there is no general peritonitis, but physical signs or clinical phenomena of local disease, I am much disturbed. Then, too, the increased frequency of pulse, or perhaps the signs of approaching collapse, which thus far, in my cases I have not waited for, would induce me at once to ask for a surgeon.

A word in regard to salines, of which I have mentioned nothing before. I have never been impressed with their value in peritonitis, although I have seen some of my colleagues administer them. In but one instance were they of any service, and this was after an abdominal section. But in all probability persons with a larger experience than I have had may see benefit. Let me not mislead any to think all my cases got well by medicinal treatment. Drs. Keen, Price, and Kelly will testify that I have sought the benefit of their skill several times.

A word in regard to a variety of peritonitis which I have neglected to mention, and that is, the so-called cases of recurring peritonitis. In a large majority of instances they are secondary to tubal disease or disease of the appendix; and if a second attack occurs in a patient of mine I advise at once operative interference, either before the attack has terminated or after the attack has subsided.

In corroboration of my remarks as to the value of the medical treatment of peritonitis, let me quote, if you please, the experience of my friend, Dr. Girvin, which, as you know, has been large, and who is a most careful, astute physician. He told me just recently that he has never lost a case of peritonitis, and that his plan of treatment is the use of some remedies to open the bowels, along with the use of remedies to allay the pain. To open the bowels he usually gives a pill containing a quarter or a half a grain of calomel, half a grain of extract of rhubarb, half a grain of aloes, with one-eighth or quarter of a grain of the extract of opium. Giving the pill early, he very soon secures a purgative effect, and when that is induced feels much more comfortable in regard to the welfare of his patient. He uses morphia by subcutaneous injection, and only in sufficient doses to keep the patient comfortable throughout the illness.

(Dr. Musser was compelled to leave the room before the discussion closed, but has learned that Dr. Baldy asked why he should endeavor to open the bowels early in a case of peritonitis. Dr. Musser begs to add this, which is the

only explanation which has satisfied himself, and which he gives, of course, with reserve, as he does not believe it has been previously mentioned. Take, for instance, a case of appendicitis with rupture. We know that the inflammation is always due to obstruction in the canal. If such obstruction breeds deleterious effects in this canal, a similar obstruction would produce the same bad effects in the larger canal, the intestine; and, in addition to an inflammation of the serous coat, a retention inflammation is set up, and an enteritis complicates the case. Moreover, great danger in peritonitis arises from the tympany, no doubt, and to prevent it the lumen of the canal must be opened early, for if not, the bowel paresis which ensues in peritonitis, and which contributes to the tympany, will prevent clearing the canal.)

DR. JOHN B. ROBERTS: On general principles I object to opium after operative procedures. The question to-night seems to be dogmatically settled by gentlemen of large experience. I was brought up on the opium treatment and have employed it. I believe now that it was a mistake in many cases.

DR. M. PRICE: I do not believe that peritonitis is ever idiopathic. Call it by what name you please, it resolves itself into some irritation or lesion. Carbolic acid, almost pure, and phenol sodique, in its full strength, I have known to be poured undiluted into an abdomen after an operation. There will always be peritonitis after operations until so-called antiseptic surgery of the peritoneum is abolished. Mr. Tait is correct in saying that the opium treatment has its place only when you have given up all hope of curing the patient and want to make him comfortable. You make him perpetually comfortable. You not only put the bowels in splints, but the whole body in a fracture-box. Prof. George B. Wood, thirty years ago, advocated after bleeding, calomel, and purging with Epsom salts and senna, and perhaps somebody suggested it before him. But in recent times the credit of the saline treatment belongs to Mr. Tait, and Dr. Baldy does not claim it. Something was said of five days' treatment. The case should be in the surgeon's hands before that. There is already pus.

The tympany is of several kinds. The distention is often the cause of death. I have opened the belly and found a diverticulum adherent to the omentum, with the intestine through it; the intestine was returned without difficulty; the distention was the cause of death. Many cases that recover are of such character. If we knew it, purging would be out of place. In operations when there are sharp pain and indications of inflammation, then we do not wait. We open the belly and supply moisture. We pour in hot water—gallons of it—and give turpentine enemata and Epsom salts.

The bowels are already in splints. I have given six ounces of Epsom salts where ordinarily half an ounce would answer. As soon as free movement occurs the patient recovers.

DR. C. B. NANCREDE: As I was the first surgeon in this city to open the belly for shot-wound, and as I never hesitate to operate on abdominal cases when necessary, I cannot be accused of timidity. But is it not time to draw the line when we are told that all cases of peritonitis which do not at once improve should be treated with the knife? I am a living specimen of recovery without section after an appendicitis.

No one has here advocated the use of a drug valuable in the sudden collapse incident to the onset or in the later stages of some cases of peritonitis, when

opium means death. That drug is atropine, hypodermically, in large doses. If it is true that the vast majority of, if not all, cases of peritonitis are secondary—or, in other words, infectious—there are many experiments besides those quoted to-night, shedding a flood of light upon the subject, which show that the peritoneum can take care not only of fluids or foreign bodies, but even of pathogenic organisms and feces, provided that the quantity introduced during a given time does not exceed a certain limit. If all the material can be absorbed in an hour or two, the animal is safe. If that limit is exceeded, we have general suppurative peritonitis. Here the eliminative treatment finds its explanation in preventing a general peritonitis, as the peritoneum is only an enormous lymph sac.

If opium is only to be given to relieve pain, this is not what was formerly understood by the opium treatment. It will not splint the bowel in mere anodyne doses, which was Alonzo Clark's original idea, and that of all his followers since.

I disagree with the medical gentlemen who would send for the surgeon to lock the stable door after the horse has escaped; in other words, wait, as is too often the case, until an operation is what is termed a "last resort," which amounts really to there being no reasonable chance for a success which an earlier resort to the knife would have very probably insured. The surgeon should be permitted to see the case *early*, and share in the decision as to when the operation should be done, when it should be postponed, and when declined; it is only by the chance afforded by a study of the *medical course* pursued by the case, that the surgeon can operate intelligently and successfully.

I am using less opium as I grow older in all surgical work. I have tried the saline treatment of peritonitis in several cases after section, and I have had no cause to regret it.

DR. JOSEPH PRICE: I have learned something new, to-night, that abdominal distention impedes the locomotion of germs. I am glad to be enlightened on this point, it will be of very great value to the class of operators that fear them so much. Experienced operators in abdominal surgery fully recognize the deleterious effects, and the great danger of distention. The mere presence of an excess of fluid or gas in the intestine is, in itself, an efficient cause of obstruction. I am not prepared to accept such counsel. I would much rather incise the bowel, and thus favor the evacuation of gas and drainage of intestinal contents. Dr. Meigs counsels delay. On the contrary, the earlier and simpler the operation the greater is the chance of recovery. I cannot, therefore, conceive any advice more unfortunate, more unjustifiable for patients dying of peritonitis. In fact, the whole tendency of modern surgery is to anticipate exhaustion, shock, and collapse. The paper of Dr. Baldy referred to peritonitis, and not to pain and tenderness, and my remarks are devoted to peritonitis due to a recognized lesion, and not to pain and tenderness.

The treatment of peritonitis resulting from external or infectious origin would be entirely irrational were drainage discarded. Once decide that the best method of clearing up a peritonitis is by operation, then drainage must follow that operation as naturally as sutures are used to close an incision.

If a peritonitis is septic in its origin, such as is seen frequently after crim-

inal abortion, carelessness after miscarriage, and after gonorrhoeal tubal disease, drainage is the third statement of the argument of operation :

1. Operation is required.
2. Douching and flooding the abdomen are necessary,
3. Drainage is the bulwark of the whole procedure.

That cases of infectious peritonitis recover without drainage, is no more an argument against it than that some patients recover from smallpox, never having been vaccinated.

If I use all the antiseptics possible before and during an operation, and at its close overlook the fact that I am leaving a possible infection behind, my antiseptics is only a parade, and misleading.

If Listerism is the foundation of modern surgery, drainage is the keystone of its application in such cases of abdominal surgery.

DR. LONGAKER: From the remarks of the previous speakers it has appeared that the opinion held of the value of opium in peritonitis depends upon the question, Is it ever an idiopathic disease? My own views are that it is not, I have never seen a case in which it was. In general I agree with Dr. Baldy.

In the *Transactions of the Pennsylvania State Medical Society* for 1888, vol. xix. p. 103, there is reported a case in which abdominal section was done for puerperal peritonitis. It was one of the first cases operated on in this city.

In June, of the present year, I operated on a second case, whose history is very interesting. Female, aged twenty-six years, married fourteen months. About two years before, she "caught cold" during her menses. Her periods became painful, and a physician was consulted. Weekly intrauterine applications were made, but as there was no improvement, and as the treatment was extremely painful for hours, other advice was sought. Two months before my visit she fell into the hands of the gentleman with whom I saw her. He found the uterus fixed by a mass in Douglas's cul-de-sac; sound entered two inches. At her next period the doctor was called up in the middle of the night because of great suffering. She passed from bad to worse, and on the day preceding my visit developed unmistakable signs of general peritonitis. She failed to get any relief in spite of grs. ij ext. of opium by suppository. Magnesium sulphate, 3j dissolved in hot water, was ordered to be given every hour. It relieved the obstinate constipation, and gave her far more relief than the opium. Twenty-four hours later abdominal section was made. Pus was found in the abdominal cavity. Irrigation and drainage were used. All her symptoms improved, but, on the fourth day, she began to fail, and died on the fifth. Autopsy revealed obstruction of the bowels. It also showed a ruptured pelvic abscess, situated in the appendages of the left side. The peritoneal cavity contained no fluid, and the operation had arrested the course of the disease. A knuckle of ileum had become adherent to the pelvic viscera, causing obstruction and death.

The case is a warning to those who are in the habit of treating the endometrium promiscuously.

DR. J. TYSON: I came to the meeting to-night attracted by the subject under discussion rather than to make any remarks, but I feel disposed to give expression to the general impression left upon my mind by this debate. I confess that when I heard Dr. Meigs portray his typical case of peritonitis I felt that the treatment he advocated would be the one I should always prefer

to follow. Yet I do not think the parallel he drew between the state of the peritoneum in peritonitis and that of a "sore" is altogether justified. The inflamed peritoneum is rather to be compared to the earlier stages of inflammation in which we resort to leeching and depletion, and I have, by what has been said since, been strongly impressed by the rational character of the saline aperient treatment. It has the further advantage in quickly cutting short those doubtful cases in which a fecal accumulation is producing pain, the first symptom of inflammation, which disappears at once with its cause—the fecal mass.

I desire to call attention to a fact not mentioned, that rheumatism of the abdominal muscles sometimes simulates peritonitis so closely as totally to mislead. I have myself had this experience, and seen the symptoms yield with magical promptness to salicylate of sodium.

DR. MEIGS: I cannot see why anyone should doubt the possibility of the occurrence of idiopathic peritonitis any more than of idiopathic pleurisy. There is no reason, in the nature of things, why it should not occur, and that some physicians have not met with it is no proof that others who say they have are mistaken. Pleurisy, by extension of the inflammation, may be the cause of pericarditis, and in cases of diaphragmatic pleurisy peritonitis to some extent is a common secondary result. If there be diarrhoea, with inflammation of the mucous coat of the bowel, why should it not give rise to peritonitis?

It seems to me that in the discussion the difference between peritonitis, as seen by those of us who are not surgeons and the disease as a sequel of operations, has not been sufficiently kept in mind.

DR. BALDY: Dr. Meigs and Dr. Musser believe in the opium treatment, and yet after giving opium for a few days they give purgatives. I should like to ask them what object they have in view when they give the purgatives, and what they expect to accomplish with them?

Theoretically it is perfectly possible to have idiopathic peritonitis. Practically, however, I have never seen it. Some of the gentlemen in discussing this subject seem to draw a line between the cases of peritonitis seen by the physician and those seen by the surgeon. Peritonitis is peritonitis the world over. It makes no difference whether it is set up by the surgeon himself or comes on idiopathically (so called): the result is always the same—inflammation of the peritoneum; the cause cannot alter the principles of treatment. My paper discussed peritonitis and not simply pain and distention; as for an inflammation throwing out a bland fluid, I do not believe it. The products of inflammation are always irritating. Opium has been advocated here to-night in small doses and to relieve pain. In my experience small doses will not relieve pain. The dose must be comparatively enormous. Purgatives will relieve the pain as quickly as opium, and when once relieved it remains relieved, which it does not do with opium. If I were aiming at the relief of pain solely, I should most decidedly turn to the salines.

The objection has been made that salines give watery stools and do not carry away much feces. Of course, it is desirable that the fecal matter should come away, and so it does in great part. But large, watery stools are exactly what we desire to obtain. The whole principle of this treatment lies in its depleting powers. For this purpose the salines are given in large and *concen-*

trated solutions: they are peculiarly adapted to the early and highly inflammatory stages of inflammation. If purgatives are going to relieve, they will do so quickly, and we have no need of waiting for four or five days to know what to do next. Often, unless we use the knife, our patient is dead in five days. Recurring peritonitis always demands surgical interference.

Together with Dr. M. Price, I have but one use for opium in this disease—if everything else has failed, it is a good thing to give *ad libitum*, to ease the last hours of the patient.

A CONSIDERATION OF SOME OF THE RECENT WORK IN ABDOMINAL SURGERY.

By JOSEPH PRICE, M.D.

[Read November 14, 1888.]

EVERY movement of scientific progress has its period of experimentation, its period of probation, during which it is weighed and its value determined; and, finally, the time of its adoption as a scientific procedure, or of its abandonment as worthless or inadvisable.

All of these stages have been passed through by abdominal surgery. Its recognition is now undisputed, though some few of the various operations proposed within the domain are still regarded as questionable in certain cases and under certain conditions. Under this latter head may be mentioned hysterectomy for uterine cancer, and splenectomy.

The operations of the various pathological conditions of the uterine appendages form, by all odds, the greater portion of abdominal surgery. The variety of conditions met here are almost past enumeration, each case varying in a manner peculiarly its own, both as to its exact causation and in its relation to other abdominal viscera. Pus tubes may be one-sided or bilateral, and the same is true of ovarian cysts. These may be suppurating or simple, or gangrenous, by reason of a twisted pedicle. Their adhesions may be nothing, varying from this to universal. As to the treatment of pus-tubes, now that their existence is acknowledged by all save a doubting few, who, unable to recognize them therefore, discredit their existence—this is established past question in the minds of a majority of operators—removal at once on discovery is the fast and firm principle. The same may be said of ovarian tumors.

Cysts of the broad ligament are also complicated or simple. Tubal disease may be found present with both ovarian and ligamental tumors. Hydrosalpinx and hematosalpinx, while we are often not able to

differentiate before operation, may also complicate ovarian disease. Dermoid cysts also afford similar complications to those of other cysts, and are quite prone to suppuration. Tubal pregnancy is of late occupying a prominent place in operative procedures, as affording the greatest scope for surgical ingenuity, while it, at the same time, is not encouraging unless taken early and treated promptly.

Its diagnosis, so much discussed, is now, by common consent, regarded as doubtful before rupture, and if made as accidental, a happy-go-lucky guess, which is harmless, and satisfactory to the operator. Mr. Tait's remarkable experience in these cases is worth that of all other operators combined, and his opinion, to my mind, is of like value, worthy of the greatest respect. An expression of his opinion in regard to the diagnosis of these cases may not be without interest. He says :

"The strangest thing of all to me is, that in the enormous experience I have now had of tubal pregnancy, I have never but once been called upon even to make an examination until the rupture had occurred, and in that case there was neither history nor symptoms which enabled me to do more than determine there was tubal occlusion.

"Not, indeed, until the rupture occurred and the abdomen was opened was a diagnosis possible. Under these circumstances, I think I may be excused maintaining a somewhat sceptical attitude concerning the correctness of the diagnosis of those gentlemen who speak so confidently of making certain diagnoses of tubal pregnancy before the period of rupture, and who speak with equal confidence of curing the cases by puncture, either simple, medicated, or electrolytic. I wish to say that, after the period of rupture, a diagnosis can, and has been made, in my own experience, in a majority of these cases. The great bulk of these utterances may stand very well in society discussions, or in library papers, but they will not stand the test of bedside experience."

Operations for the removal of gall-stones offer great inducement for successful treatment. Treatment of the ileo-cæcal abscess of appendicitis by the abdominal section offers a direct method of dealing with this hitherto usually fatal or chronic affection. When the lesions are clear, the lateral incision is the choice. The median section is, for many reasons, often advisable, and when there is any doubt as to the exact condition of the case is, perhaps, the best. The closure of the incision should be insisted upon, and drainage carefully established. To insist on strict antisepsis in an operation, and then to leave the abdomen open, appears a contradiction in terms, and is illogical.

A method of treatment of pelvic abscess, not in accord with the generally received methods, is that reported by Professor Martin, in

the May number of the *American Journal of Obstetrics*. It is to treat the abscess by puncture through the vagina, and where there is difficulty or uncertainty in fixing and locating the tumor, to open the abdomen, disengage the mass from its adhesions, bring it down within reach of the trocar, and, finally, puncture and introduce a drainage tube. He reports the three cases so operated upon, and says: "The wound is not washed out, and the tube remains for months after the patient has gotten out of bed."

A brief discussion of this method seems not out of place. Any operator who, fearing to open the peritoneum, would prefer to puncture through the vagina, would have some measure of reason on his side. But to open the abdomen to free a mass from its adhesions, in order to bring it within reach of a trocar through the vagina, seems too fantastic in its conception to be entertained for a moment.

As to Professor Martin's method of locating and fixing the tumor by abdominal section, making vaginal drainage, and closing the abdomen without attempt at removal of the tumor, I cannot but disapprove of it.

In this case, only the operator's name makes it possible for such a suggestion to receive a following. When a man of Professor Martin's acknowledged ability, operative dexterity and skill, makes a suggestion, and gives it his sanction, it is taken as the gold of his experience, with the stamp of his approval.

Ordinarily, this is worth much. But even genius is liable to err; and I believe that before long Professor Martin himself will relegate this procedure to oblivion, along with the other abandoned operations of our profession, and, if suggesting nothing new to replace it, go back to the older, and, I am convinced, the better plan of removal and drainage through the original abdominal incision.

If I open an abscess through any wall, why not drain it through the original incision? To open the abdomen simply to bring a mass within reach of a trocar after it has been freed from its adhesions, is on a par with making an incision over a diseased bone; carefully freeing the sequestrum, taking care also not to remove it; diligently suturing the incision, making a second incision, by whatever means fancy may dictate; introducing a drainage tube, and allowing the dead and stinking mass slowly to come away.

I am sure one method is just as logical as the other.

The idea, too, of allowing a woman to carry a drainage tube for months, when a section, with the removal of the mass, will allow her

in the majority of instances to go about well, free from such annoyance and discomfort in three weeks, is preposterous. We are too far from Egypt and the pyramids to plough our ground with sharpened sticks.

Whatever improvement is to be added to the technique of any operation, should be in the line of progress, and nothing should be proposed for the sake of novelty and innovation. Originators are few, imitators are many, and the harm done to suffering humanity by those who follow without thinking and without special training, simply taking the dogma of a leader, is incalculable.

The treatment of any pelvic abscess simply by puncture and drainage through the vagina, is at best a slow procedure, and, I fear, will not give a measure of success comparable with the discomfort it so often entails.

A discussion of the recent work in laparotomy would, however, be incomplete without some allusion to a peculiar fact concerning the operators in this branch of surgery. I mean the comparative youth of many of our abdominal operators. As a man neither very young nor yet in the sere and yellow leaf, I may refer, perhaps, more impartially to these men, leaving their disparagement—both by their elders, on account of their youth, and by some of their co-workers of equal age, on account of a feeling, so often the deep damnation of our profession, an overpowering jealousy—behind me, resurrecting it, only to bury it deeper, I trust, in the ditch that the merit of these men have dugged for it.

I hear cried on all sides, "There are too many men at work." To this I can say "Amen," but not in the sense of the complainants. The work of many men now beginning is the uncompleted and imperfect work of those who have preceded them. There are too many imperfect workers with experience to give them prominence; there are too few conscientious workers, young or old, to recognize and relieve the suffering women in the courts and alleys of this and other cities and towns. The old worker who will not learn is more dangerous, and his work more to be deplored, than that of the young man, giving time for careful training, watching, and working, that he may fail in nothing to perfect his art.

Once teach the younger operators, or the young men about to devote themselves to this sort of work, that this early recognition of abdominal disease is the keynote of success in all its branches, and we will have no crying need, as it is our shame still to have, of a

Bantock and Tait expostulating against the delays of prominent operators, as dangerous and often fatal.

Mr. Tait's second series of 1000 cases just published, proves by indisputable statement of facts, together with incontrovertible logic, that early operation, and completed operations, give patients the best possible chance of recovery.

When an operator has a success indicated by a mortality of only 5.3 per cent. in a thousand cases, his dictum must be respected even by his enemies.

A full discussion of all progress would be impossible in the limits of this paper, and it is not intended to be exhaustive. At a future time I trust to consider a few of the more important abdominal operations more at length.

In the light of the originality of its conception and importance, it would be unjust to conclude this paper without referring to the method of using hydrogen gas in the localization of intestinal wounds. This idea offers a still further field for investigation, and renders the surgery of gunshot wounds at once simpler and safer.

DISCUSSION.

DR. THEOPHILUS PARVIN: My remarks will be chiefly in reference to the treatment of extra-uterine gestation. Quite agreeing with the writer that the certain diagnosis of this condition in the early weeks is impossible, and that the great majority of cases are recognized only after the rupture of the gestation cyst, I must think that those instances in which early recognition was asserted were altogether exceptional, and the recognition only a conclusion of probability, or a fortunate guess.

But an extra-uterine gestation being known, the question of treatment immediately presents itself. Different answers to this question are given. What may be called the American method, because more employed in this country than in any other, owes its origin to Dr. J. G. Allen, of this city, who successfully employed the faradic current for the purpose of destroying the life of the fetus. One of the criticisms made upon this method is that the proof of the extra-uterine gestation fails in that no product of conception is revealed, the *corpus delicti* cannot be found; there may be as many as two or three exceptions—that is, some time after foetal life has been destroyed an abscess has communicated with the exterior, and parts of the fetus been discharged. Nevertheless, the question has been asked, whether, in the long list of cases in which electricity was employed, with such unusual success, there were some in which the fact of pregnancy was not conclusively proved.

In regard to those few cases of asserted interstitial pregnancy in which the

fœtus entered the uterus, obedient to the electric stimulus, and then was expelled through the natural passages, I must confess to the least scepticism as to the correctness of diagnosis in all, for such a uniformity of successful results, the fœtus in all cases behaving so well seems extraordinary; is it not, at least, probable that, in some instances, the rupture of the cyst would be into the abdominal, instead of, invariably, into the uterine cavity?

The injection of morphia into the fruit sac, for the purpose of destroying the life of the fœtus, is a method regarded with favor by some eminent German authorities. Even if always successful, and devoid of danger, the same theoretical objection, which has been made to the treatment by electricity, applies to it. There are still other objections to both methods.

There remains the treatment by abdominal section. Now this is applicable to cases of ectopic gestation, whether rupture has occurred or not, though in the former, it seems to me, it is imperative. Others, beside Mr. Tait, have had valuable experience in the surgical treatment of this affection, though none, probably, a title of his; thus Worth has operated seven times with six recoveries, and so firmly convinced is he of the importance of abdominal section that he declares an extra-uterine gestation ought to be treated as a malignant tumor—that is, extirpated at the earliest moment.

At the Philadelphia Hospital, quite recently, the abdomen of a woman was opened on account of rupture of a gestation cyst; a large amount of clotted blood was found in the abdominal cavity, but no bleeding points discovered, and, therefore, no ligation of vessels was done, or extirpation of the fragments of the cyst; the woman's chances for recovery were vastly increased by the thorough cleansing of the abdominal cavity.

After having witnessed several operations for extra-uterine pregnancy performed with great skill, and the results being uniformly favorable, I am more and more convinced that this is the method of treatment for all cases, the only exceptions being an abdominal pregnancy so far advanced that there would be hope of extracting a living child at term, and then the operation might be deferred until near the close of pregnancy, and an unruptured interstitial pregnancy.

A word as to tubal collections of pus in puerperal septicæmia. I cannot believe this is frequent, either from the few post-mortems of women dying of puerperal fever which I have seen, or from my reading; in the last edition of Schröder's *Obstetrics*, 1888, for example, it is stated that occasionally, or sometimes, such collections are found; I cannot, therefore, hope that any great diminution of the mortality of puerperal fever will come through removal of pus-filled tubes.

The brilliant results obtained by Mr. Tait, and many operators in this city whom I might name—the almost total exemption from mortality which their statistics show, must not mislead us, for there are dangers in abdominal sections, and patients may die shortly after a so-called successful operation. Thus, a little more than two months ago, in conversation with Dr. Lombe Atthill, of Dublin, he told me of a lady operated upon by a distinguished surgeon, and she perished from hemorrhage a few hours after.

The treatment of pelvic abscesses by abdominal section is, of course, a valuable addition to therapeutic means. But are all intra-pelvic inflammations with suppuration amenable to this means? Given a case of inflamma-

tion adjacent to the uterus, the parts matted together making a resisting mass as large as the two fists, or larger, the patient suffering from the peritonitis, and having fever, can the offending pus be safely reached through the opened abdomen?

Then, too, are there not other limits to the employment of abdominal section in diseases of women? I do not object to the removal of the tubes in cases of pyosalpinx, on the false ground that the woman is thus rendered sterile, for a tube so diseased can never have its functions restored—it is hopelessly, remedilessly ruined. But what of the removal of the ovaries for pain, or for certain nervous disorders? Does such removal cure, or even palliate in the majority of cases? Here is a question that demands careful and large investigation. Doubtless, some cases of so-called menstrual epilepsy are benefited by the operation, but it is doubtful whether many absolute cures result. It may be questioned, too, whether pain in the ovaries, the organs being otherwise normal, the so-called ovaralgia, demands their extirpation. I have seen a woman whose ovaries had been removed on account of pain; the suffering returned as severely as ever, and then the stump of each pedicle was taken away, but not the slightest benefit followed—a year after the last operation she was as bad as before the first. I have myself removed the coccyx for well-marked coccygodynia, and for a time the benefit was marked; and then came just as severe pain in the sacrum as there previously had been in the coccyx. Let us honestly and impartially look at both sides of the picture, see the dark as well as the light offered, and not be carried away by contemplating only the latter.

DR. M. PRICE: I agree with Dr. Parvin and the writer that the diagnosis of extra-uterine pregnancy in the earlier period is simply a lucky guess. I must differ from Dr. Parvin, however, when he doubts the feasibility of operation in a pelvis full of a great mass of inflammatory thickening. No matter how great the mass or how extensive the adhesions, unless malignant, it can certainly be removed. I have had no trouble in tearing away adhesions until the mass in the pelvis was reached, a diseased tube found and removed, abscesses opened and drained. I have seen but one bad result and that was from the deprivation of food and stimulus; the nurse absolutely robbing the patient of it, a fact I did not discover until too late. I have encountered hemorrhage from the tearing of adhesions but once, in which case it was controlled by three ligatures on the bowel itself. The cause of hemorrhage in most cases of abdominal section is imperfect ligature. The ligature slips and the patient bleeds to death. In tearing adhesions from the broad ligament I once ruptured a vessel as large as the radial artery. I had no trouble from this after it was properly secured in the pedicle. The button is sometimes cut too short: the ligature which is holding the uterus between the broad ligaments like a guy rope cannot stand the strain, the pedicle slips out and the cavity is flooded. Here is one advantage of the drainage tube. It gives warning of such an accident. The nurse ought to be trained to recognize warnings so that the operator may be summoned without loss of time.

The question of antiseptics in these operations is an important one. I must protest against statements upon this floor that operators who fail to use chemical antiseptics should be held criminally responsible. I say they should never be used in the peritoneal cavity. They increase the risks and never

benefit the patient. Cleanliness and readiness for emergencies are the requisites for abdominal surgeons. Mr. Bantock, and Mr. Tait since he has abandoned Listerism, have results fully as good as any operators in the world. Such statements must not be permitted. They may bring danger and trouble upon fellow-practitioners conscientiously striving to do the very best for their patients, and, therefore, rejecting antiseptic solutions, as dangerous in themselves, and as leading to dangerous neglect of cleanliness by a sense of false security.

DR. JOHN B. ROBERTS: I am one of those surgeons who believe that any person who undertakes surgical operations at this stage of the world's history assumes a grave responsibility, is guilty of a wrong to his patient, if he does not guide himself by modern teachings in regard to the prevention of septic accidents. At the same time I think that Dr. Price and others who think with him, are giving themselves unnecessary anxiety as to the force in jurisprudence of the expressions made upon this floor and elsewhere by surgeons who give voice to the modern theories of operators' responsibilities. The word antiseptic is misconstrued. It does not necessarily refer to chemical agencies. The point is, shall we have the old septic surgery or the modern non-septic surgery? So that infection be excluded, it makes no difference whether we exclude sepsis by chemical agents, by heat, or by absolute cleanliness. Under the influence of the teachings of Dr. Price and his brother and the results obtained by them and by their pupils, I have resorted with confidence to distilled water in abdominal and pelvic work. But that is simply a substitution of heat as an antiseptic agent; and it is antiseptic surgery that Dr. Price employs, or aseptic surgery if he prefers that term, when he takes scrupulous precautions to secure absolute cleanliness of hands and instruments and all the details of the operation. There is no necessity to quarrel about words. The fact is that it is the consensus of opinion of the men of the day who have a right to express opinions upon this matter, that the surgeon is bound to protect his patients by those means in which he has greatest confidence against the risks of sepsis, and that any operator who neglects this is guilty of a crime; and it is well to have that distinctly stated here and in all medical societies until the whole body of the profession realize that it is a cardinal principle of surgery. As I said before, we do not and need not pin our faith to chemical agents, though I am among those who find use for chemical agencies, but we must insist upon non-sepsis and then we will have the best possible results.

DR. H. A. KELLY: Some of my growing experience has led me to differ from some of the details of procedure recommended. Above all, I do not think it imperative nor wise to operate upon pus-containing tubes and ovaries as soon as discovered. These cases are with few exceptions essentially chronic in their course; I operated last spring upon a woman who had carried a pelvic abscess for nineteen years. The natural history of this disease is one of attacks of recurring localized peritonitis; during the attacks they are exceedingly prostrated and the danger of operation increased. I know of no other cases which improve so much and are so amenable to treatment. With rest and the use of hot water we will, after a few days or a week or two, find the great mass of fresh inflammatory deposit gone, and are then able to make out the outlines of the diseased uterus and tubes which we now

find movable, and we can proceed to operate under more favorable circumstances. Where rupture has occurred and the inflammation is general, delay is fatal. Opening a sac which points into the vagina is in some cases far better and safer surgery than abdominal section. In a case which had been mistaken for typhoid fever, and in which an excellent gynecologist had clearly diagnosed pelvic abscess, but wisely declined abdominal section on account of her prostrated condition, I operated *per vaginam* in September. After determining by palpation the point of greatest fluctuation, I separated the anterior and posterior walls of the vagina by Simon's specula and gently lifting the cervix, without making traction, burned a hole into Douglas's cul-de-sac, which was filled by the tumor, opening a pus sac containing more than a pint of pus, washed it thoroughly, drained, and douched daily. The patient made an excellent recovery, walking into my office this morning. She was too weak for abdominal section and her life was thus saved.

Three years ago I was able, before rupture, to diagnose tubal pregnancy. I operated before rupture, and I have the fetus in my possession now. A pathognomonic sign, which we do not wish to wait for, is diminution, while under observation, in the size of a cyst, presenting the other signs of extra-uterine foetation, due to absorption of the amniotic fluid. It only occurs after the death of the fetus.

I am not a warm advocate of electrolysis, but it is an absurd mistake for an English writer to think that in America the sac is punctured in the operation of electric foeticide. The great difficulty with many cases put down on the lists as ruptured tubal pregnancies is that sufficient evidence is not presented to show us that the cases actually were pregnancies. Where the fetus is not found we want more than doubtful macroscopic signs.

Among the recent advances in abdominal surgery I would call attention to an operation which I have devised to avoid the dangers of sepsis and hemorrhage, and the dangers and annoyances of the extra-peritoneal clamp method of treating the stump in supra-pubic hysterectomy.

I liberate and deliver the tumor with the uterus, and constrict the pedicle with a rubber tube, then trim off the tumor above the tube leaving a cupped stump. This I very carefully bring together by a continuous buried suture, beginning at the bottom, which runs to and fro on the stump until it is closed, so that the top of the stump now looks like the mouth of a purse. Then raising this I pass a stout ligature deep into the uterine tissue on either side below the rubber tube with a sweep of my needle, and by tying this ligate the uterine artery, then I cut the constricting tube, and if there is any hemorrhage from the lips of the sealed canal I pass another deep ligature on either side which controls all oozing. The abdominal cavity is now completely closed by stitching the peritoneum of the wall to the peritoneum of the stump, *above* the ligatures on the uterine artery, and leaving the sutures, which thus unite the two peritoneal surfaces, long. A gauze dressing is put over the whole. These ligatures are brought through a hole in the gauze and clamped in a pair of ordinary long-bite dressing forceps, effectually preventing dragging and inversion. These sutures can be cut in seven to nine days. The result is perfect. My friend, Dr. Polk, tells me he has a plan in its essentials very similar to this.

DR. J. M. BALDY: I quite agree with Dr. Parvin that it is a happy guess if we diagnosticate tubal pregnancy before rupture. In a case seen a year or more ago, all the signs which we would expect in a case of extra-uterine pregnancy, were found present and a diagnosis made in accordance with these facts. An ovarian cyst was found at operation. It is claimed that such a mistake would not take place if due care were used. But such a well-known authority as Mann, of Buffalo, has made such a mistake; he treated his patient with electricity, killed the fetus, and later the case was operated on by Wylie, of New York, and no signs of extra-uterine pregnancy found. Dr. Kelly speaks of a shrinkage of the sac from absorption of the amniotic fluid being a pathognomonic sign of this disease. I have never heard of this being advanced as a sign by any one else, nor can I conceive of its occurring.

Puncture, as a treatment, can only be mentioned to be condemned. Electricity has the advantage of being able to kill the fetus and of saving the woman from the horrors of a severe surgical operation. It, however, has its disadvantages; a mass is always left behind which will be likely to cause all the dangers that any other pelvic disease may; it often ulcerates out and it leaves the patient as much unsexed as the operation would. I think the gentlemen who remove other pelvic troubles with the knife and leave this one, are more than inconsistent. Again, rupture of some of the vessels in the sac wall may take place. Mann thinks that these dangers should not be taken into account, but as they form together quite a large per cent. of the total number of extra-uterine pregnancies, what sane man dare disregard them? The electrical treatment has its positive and immediate dangers. Janvrin has lost a patient by rupture of a bloodvessel, after killing the fetus. An electrical current passed through some pelvic growths always makes the patient worse. I have seen this happen in the hands of an experienced electrician, the patient being worse after every treatment. With the knife, no case has ever been killed, and when the operation is over no subsequent trouble can follow. The trouble can always be removed in the early periods. As soon as a probable diagnosis is made, a surgical operation should always follow.

In regard to operations for abscesses, I do not share Dr. Parvin's views, I think these large adherent masses can always be removed without danger, and that such should be their treatment. After once beginning the operation I should much more fear leaving it, than removing at any cost: it is the incomplete operation which gives us the worse results. On the other hand, I most heartily agree with Dr. Parvin, that only diseased organs should be taken away. If the operation for vague pain, epilepsy, insanity, and nervous diseases has any place, it is only after the most careful consideration and consultation, and in the most conservative hands.

With regard to the fibroid tumors, I think with Dr. Kelly that the extra-peritoneal method of treating the stump is a long and disagreeable one on account of the sloughing. The intra-peritoneal method, which I had the pleasure of seeing Martin do several times in Berlin, is in every way preferable, if we can do it with equal safety. Although my cases treated extra-peritoneally have gotten well, I see no reason why those done by the other way should not also, and I shall be tempted to try it at the first opportunity. The

method Dr. Kelly proposes is a half-way one, and loses some of the advantages of both the others, without gaining very much.

And now, Mr. President, one word in regard to antiseptics, since the subject has been brought forward so prominently again. My convictions on this subject are very strong and are the result of much and very earnest hard study. I believe most firmly that germicidal agents used in the abdominal cavity are not only useless but most positively harmful. At all events this subject is not to be considered closed: it is open to discussion and trial, and I most earnestly protest against any such sweeping statements as have been made on this floor by Dr. Gross in times past, going before the world as the final dictum of this Society. Personally I never use chemical agents in my surgery, and I have the best of results. There are a number of other gentlemen in this city who follow the same practice. I will pick five or six such men and compare their results with those of any other six operators in Philadelphia, and if our results do not equal or better those of our opponents, I will concede the point. In view of these facts Dr. Gross and others have no right, by any such statements as they have made, to put us in the position to be taken into court in a malpractice suit: this is exactly what such absurd statements will lead to. If a surgeon goes to an operation with dirty hands, an eighth of an inch of dirt under his finger-nails, dirty instruments and what not, because, forsooth, he has dipped his hands and instruments into a solution of carbolic acid or corrosive sublimate he is to be exempt from responsibility; but those of us who have probably spent days carefully preparing for an operation, studying every detail and taking every rational precaution, because we do not choose to follow this absolute dictum of our wise masters, must be held responsible. Does any sensible man think that these solutions really penetrate the dirt under some operator's finger-nails and disinfect them? For my own personal safety sake, Mr. President, I must protest against the assumption of these men.

DR. GEORGE E. SHOEMAKER: In regard to the diagnosis of extra-uterine pregnancy before rupture, the remark of Mr. Tait quoted by the writer is often referred to, but is not of as great weight as might at first appear. Mr. Tait has not said that he has failed to recognize a case, but that he has not seen one. One difficulty is this: Mr. Tait, for example, is an operator, not a man in general practice, and would be likely to see only cases brought him by others. These cases often occur in women previously healthy, their early symptoms are not very striking, therefore they are not in the hands of the general practitioner, and are not brought to the notice of the expert diagnostician. The latter then is not at fault. A case was recently reported in *The Medical News* in which the diagnosis was made before rupture, and in which operation proved it correct. I believe that if the general practitioner called an expert consultant early, and carefully chose the expert, the true nature of the case would be recognized in a far larger proportion of instances.

DR. M. PRICE: Dr. Kelly's treatment of the pedicle is no more intra-peritoneal than if the wire clamp was used, and not half as safe. The ligature to pull up the stump in case of need is an additional objection.

DIABETIC GANGRENE.

By WILLIAM HUNT, M.D.,
SENIOR SURGEON TO THE PENNSYLVANIA HOSPITAL.

[Read November 28, 1888.]

My young friend, Dr. Charles B. Penrose, who, at the time, I did not know was one of our directors, told me not long ago that he had a case of gangrene in a negro which puzzled him and he gave me a few of the points. I said "that man has sugar diabetes; test his urine." A few days after he crossed the street to tell me that the man's urine was full of sugar. "Yes," said I, unwarily, "I have seen and had under care quite a number of cases." "Then," was the reply, "you'll read a paper on it before the County Medical Society, on the 28th of November," and straightway he whipped out his pencil and put me down as engaged for that night. Resistance was useless, and I promised to open the subject for discussion to-night with a record of my experience, and as much more as I might choose to add. I kept no close notes of my cases, which I think is rather an advantage for my hearers, as it saves them from listening to much tedious detail, and such detail is not the object of the present discourse. Of course, it was necessary to take a glance at the literature of the subject. This is vast as to diabetes, and as to gangrene in general but meagre, and in some respects surprising as to diabetic gangrene. There are about twenty pages of the great *Index-Catalogue of the Library of the Surgeon-General's Office*, which is double-columned as you all know, given to each of the subjects of gangrene and diabetes. You have to search sharply for anything associating the two. The French seem to have the best of it up to 1868. There are but two monographs catalogued, one by Giron, Paris, 1881, and one by Peyrot, a student, 1878, who reports, I think, thirty-nine cases; these are not in the College of Physicians' Library. Then ten isolated cases are reported in the French journals from 1856 to 1868; most of these are in *L'Union Médicale*. I will give a brief summary of these cases, most of the reporters of which think they have hold of something very rare

and interesting, and you will not wonder at this when you hear more of this literature.

1st. A case of phlegmon and gangrene of the anterior and external region of the right knee. Free incisions were made. The patient was discovered to have intermittent diabetes. There was recovery from the local lesion.

2d. A patient known to be diabetic had his right toe to slough; it was detached with scissors. From this he recovered slowly. He was placed on strict antidiabetic treatment, but was careless and the whole foot became gangrenous. There was great abdominal pain, and necrosis of the gastric mucous membrane was diagnosed; death speedily followed; no autopsy.

3d. A diabetic of sixty years of age is reported, who died from extensive gangrene of the thigh and back.

4th. A doctor, aged sixty-five, fell down from an attack of cerebral congestion; never sick before. Diabetes was discovered. This was on the 21st of the month; on the 25th great mortification took place involving the cellular tissue deeply, followed by death.

5th. A man had a leg amputated for what was thought to be senile gangrene. He recovered slowly from this, then the other leg was attacked, first at the toes. He was found to be a diabetic.

6th. Another diabetic is mentioned with spontaneous sphacelus of the right toe.

7th. A colonel with his right foot gangrenous died of diabetes. Other cases are here and there mentioned with spots of gangrene.

8th. A man of seventy, after great pain, had gangrene, first in left toes, then in right. The disease was thought to be senile, but he was found to be a diabetic. The absence of ammoniacal changes is noted in this case, and the question is raised whether the urine of diabetics undergoes these changes.

9th. A case of complete destruction of the plantar aponeurosis by gangrene in a diabetic is reported with recovery from that lesion.

10th. A man of fifty-five, cut his corn—gangrene followed and diabetes was present; he died. He had before this no symptoms of diabetes—in fact, was never sick. He went through troublesome family affairs, which he felt deeply, some time before.

These patients where the sex is given were males. Mental troubles are more than once given as a cause. Intermittence in the appearance of sugar is noted in two cases. In fact, in one of them, the interne tells his chief, that he (the chief) had made a mistake. The interne had examined the urine when sugar was absent, but it returned in full. The majority of these cases were in the better walks of life. But the work worthy of a higher dignity of title than a monograph is by Marchal (de Calvi), Paris, 1864: *Recherches sur les Accidents Diabétiques et Essai d'une Théorie Général du Diabète*. Some of his cases are among those quoted above.

Marchal claims to be, and with some force, an original discoverer. He places 1852 as the dividing line between the periods when, in the

first, gangrene occurring during the progress of diabetes was regarded by all as a simple coincidence, and the second, when gangrene occurring among diabetics it is the result of inflammatory conditions dependent on the disease and due to the irritation of the peculiar products of it, which are thrown into the blood and tissues. This last is the so-called discovery, as I understand it, and there is some discussion as to priority, for Hodgkin of London, about the same time, as we shall see, took the same view. Marchal was, of course, criticised by his own people, one of whom was Charcot. The cases, facts, and comments are divided into two series, those published before the discovery, and those published after it. The collection is really remarkable, both as to number and as to character of cases, and especially so when contrasted with German, English, and American reports and literature on the subject up to that time. Marchal's book has reports of one hundred and thirty-three cases of all sorts of what I may call extra lesions occurring during the progress of diabetes, collected both before and after the discovery. In the notice of three cases of Carmichael, Adams, and Marsh in the series before the discovery, these remarks occur: "The mention of these cases does not give place to any general deduction. The question to know is, whether there exists a necessary relation between gangrene and diabetes, a question which appears to have been totally lost from view." Of the 133 cases, gangrene *per se* occurred in 57. The seats of it were, in the lower extremities 35, lungs 7, hand 3, pleura 2, shoulder 1, nucha (not ordinary carbuncle) 2, nose 1 (necrosis), plantar aponeurosis 2, ribs (necrosis) 1, forearm 1, back 1, gangrenous plaques 1—although the latter are reported in several other cases. I shall not pretend to particularize these cases; I refer any one interested to Marchal's book. My purpose is to show that gangrene in diabetes is something more than a coincidence. The extraordinary case No. xxxix., almost of itself sustains the position. A man of fifty-eight years, came under observation. The case is given in detail and is thus summed up by Marchal. "Thus in the space of six years from 1850 to 1856, the patient was attacked successively with first, a necrosis of the first phalanx of the second toe, which was amputated; second, with a sphacelus of the whole foot and inferior part of the leg of the same limb, which was also amputated; third, with a skin gangrene of the other leg which gave place to a callous ulcer; fourth, with a gangrenous inflammation of the base of the great toe, which left a deep and intractable ulcer; fifth, with a sphacelus of the first four toes, which were also amputated." Through all this melancholy history

no suspicion of diabetes was raised until attention having been called to the case through Marchal's labors, the urine was examined and the man was found to be a positive diabetic, and he was proved to have been one for years. Other multiple cases are reported. This by no means exhausts the French literature. Verneuil, Nélaton, Lizé, Peter, Charcot, Demarquay, Peirot, Chauvel, and others have done their share in the observation of cases and in elucidating the subject. I will now take a short notice of German, English, and American work in this line.

The great *Index-Catalogue* I referred to is dated 1882, and in going twice over those thirty-seven double-columned pages devoted to diabetes and to gangrene, I found no monograph on diabetic gangrene in German. There is one case of it reported by W. Roser of Marbourg, and an article by him upon it in the *Medicinische Wochenschrift*, Berlin, of January 1, 1880. Billroth, in his *Surgery*, merely mentions diabetes mellitus as a possible complication of gangrene. Hodgkin read a paper before the Harveian Society, session of 1852-53 (*Journal of the American Medical Association*, 1854, p. 915), and, aside from this, there is no notice of an English article or case in the index. I may have missed them, but I thought I looked sharply, else how did I find the French ones? There is one Italian case reported.

The Marbourg professor (Roser) grasps the situation thoroughly. He says: "When an otherwise healthy appearing man has a gangrenous or ulcerous disturbance, for example, on the foot or hand, when one can think of no infecting cause, when all irrigations with carbolic acid, etc., are in vain, it is *high time to think of diabetes*."

He attributes the past failures of diagnosis and consequently of proper treatment to three causes: First, to the fixed, classic, and preconceived notions as to diabetes, viz., that an otherwise well-looking and well-nourished person cannot have it; that the usual symptoms, thirst, emaciation, etc., must be present; so to say, a cachexia. (These points I can practically confirm as well taken.)

And what are we to think of this?

"Second. In gangrenous destructive processes *now*, one takes it for granted that a rotting, generating, chink-fungus (literal, Spaltpilz) has got in from without and is the cause of all the trouble, and one is obstinately striving to stop or make impossible the vegetation of this chink-fungus and to control the advancing sepsis by still more obstinate applications of carbolic acid [he quotes carbolic acid as the type of the germicides, for he has u, s, w in some places], and so long as

one remains in this blind thought, he naturally seeks for no other etiology.

"Third. Even when the diabetes is discovered, the doubt is set up whether it has anything to do with the gangrenous destruction, and then it is still more strongly doubted whether a treatment appropriate to the case, both constitutional and local, can mend matters where there is a high grade of diabetes." Cases are then given, some of which are taken from Marchal. A plausible explanation of some cases of otherwise unaccountable sloughing after operations is suggested in the possible presence of diabetes. I came across some such cases. Roser supports Marchal's axiom, "One must always think of diabetes and examine the urine, when one has to deal with obstinate and repeated cases of furuncle, anthrax, diffuse phlegmon, gangrene or sphacelus, and the like affections." (This is all I shall translate, for I find there is a longer abstract from this article of Roser's in the *Chicago Medical Gazette*, 1880, vol. i.)

Since Roser's paper the Germans have paid more attention to the subject. I find in the *Annual of the Universal Medical Sciences*, vol. i. 1888 (a book which brings our literary knowledge of a subject fairly up to the present day), that in the *Centralblatt für Chirurgie* König "points out" what this article shows has been long ago known, that diabetic patients are subject to a low grade of inflammation; and he issues the dictum, "that in all cases of spontaneous gangrene the urine should be examined for sugar, and in surgical complications of diabetes the first and most persistent treatment should be anti-diabetic." In the article upon surgical diseases in the *Annual*, collated by Dr. Christopher Johnston, of Baltimore, an interesting case of diffuse gangrenous phlegmon in a diabetic is reported, and after some remarks and extracts as to the causes of the various gangrenes, this rather heavy quotation closes a paragraph: "The differential diagnosis is simplified since antiseptis has detached gangrenous septicæmia from the morbid coexistences which complicated its symptomatic category."

English and American literature on diabetic gangrene amounts to almost nothing. After Hodgkin's paper, 1852, the affection seems also to have been totally lost from view, and no one appears to have taken any especial interest in the subject. Hodgkin is the one with whom the question of priority was raised with Marchal. He reports several cases, one that of a young man who, after venesection for diabetes, developed an acute pneumonia. He died, and gangrenous softening was found surrounding tubercle. Another case, in an

elderly gentleman, with symptoms of the same kind; no post-mortem. Two more with gangrenous feet. Then follows this important remark: "Reflecting upon the evident tendency of diabetes to impair the vitality of the tissues, I could not but attribute it, not to accident, but to an essential connection between the disease and the function of nutrition."

After this I found no monograph on the subject, nor no particular reports of cases in our language. They must exist, but I got tired looking for them, and at any rate I proved them to be rare. I searched some works on general surgery, including text-books, and allow me to say in passing, that I do not allude to them in the spirit of carping criticism, but to show how this important matter has attracted such small attention. I also may have overlooked something, but here is the result. In only one of these books do the words *diabetic gangrene* occur in the index. This is in Ashhurst's *International Encyclopedia of Surgery*. They refer to six lines given to the subject by Professor E. M. Moore in his article on "Gangrene and Gangrenous Diseases." Even the great *Index-Catalogue*, with much more insignificant headings about gangrene, has no heading *diabetic gangrene*. The subject is not noticed in any way by Ashhurst, Agnew in his first edition, or by Bryant. Agnew speaks of traumatic diabetes in injuries of the head, and Erichsen gives a case of a severe blow upon the back of the head followed by concussion and the rapid development of diabetes, but makes no mention of diabetic gangrene in his early editions, but has quite an extended notice of it in his last one. Agnew, whose attention of late years has been drawn to the subject through meeting with cases of it, writes about it in his second edition (vol. i. p. 192). Prof. S. W. Gross (late editions) gives us a short notice under the head of chronic gangrene, which he says "is occasionally associated with, if not directly dependent upon, organic disease of the kidneys, especially that form of it which is attended with saccharine diabetes." And he refers to the elaborate observations of Marchal and Verneuil. Holmes Coote, in Packard's edition of *Holmes's Surgery*, in his fine essay on gangrene, does not notice it in any way, nor does his reviser, Dr. P. S. Connor.

So much for the surgeons. Pavy, 1862, makes no mention of gangrene; to be sure, his researches were mostly in different directions, although he alludes to other complications. Squire in a short essay is equally silent. Dr. Tyson, our acknowledged expert in urinary matters, says: "Gangrene of various parts of the body is another of this class of symptoms; it is sometimes spontaneous, but

more frequently is immediately caused by some trifling injury, which under other circumstances would be without result. It has been known to start from a blister. The mode of origin makes it unnecessary to seek *any further immediate cause*, such as inflammation, degeneration, obliteration of arteries, etc. Beginning most frequently in those parts of the body most remote from the centre of the circulation, as the toes, its progress and appearances are like those of senile gangrene." Tyson also gives two passing notices to gangrene in his later article on diabetes in Pepper's *System of Medicine* (pp. 205 and 210), and also in Sajous' *Annual*, where he quotes from a French authority a case of gangrene of the penis in a diabetic. His remark that the gangrene is *more frequently* caused by some trifling injury is not sustained by the histories of the reported cases. It is doubtless *started* in some, as we have seen, by such an incident, the place simply being determined by the injury. The differences from senile gangrene are also mostly well marked.

W. Roberts has quite a paragraph on diabetic gangrene in his work on *Urinary and Renal Diseases* (4th ed., 1885). He quotes Marchal, Hodgkin, and others. Niemeyer mentions it only as a possible complication. Fagge gives it four lines, and confines it to *one* of the lower limbs. We have seen how it may be multiple, and simultaneously or successively attack different parts of the body in the same person. Watson, quoting Garrad, mentions gangrene. Flint and Aitken speak of it as a possible complication of diabetes.

Whilst writing this, Schmidt's *Jahrbücher*, No. x. for 1888, comes to hand, bringing us up to October of this year. In it there is the latest general article on diabetes mellitus, a review, twenty-eight pages in length, by Dr. Louis Blau, Berlin. The paper opens with a list of seventy-four different articles on the subject from 1886 to date. Among the Americans mentioned are J. M. Da Costa and L. K. Baldwin. This catalogue gives the same experience as the *Index* of the Library at Washington. Only three articles refer to diabetic gangrene, one by König, "A Revision of the Knowledge as to Capital Operations (Amputations) during the Progress of Diabetic Gangrene," and two cases (both French) of diabetic gangrene of the external genitals are reported.

Blau gives credit to König for confirming the frequent tendency to inflammations giving rise to gangrenous processes in diabetics. This (the gangrene) may appear to be spontaneous, but it calls for an examination of the urine if that has not been made.

He as well as König is a firm believer in these inflammatory gan-

grenous affections being dependent upon specific microbes, as do other incidents of diabetes. The easy passage into gangrene is favored by the less resisting power of the tissues than when in health, and, also, it may be, the presence of arterial sclerosis.

The diabetic is at a disadvantage with the sound man, in that there is a greater tendency in him to take up the microbes in his tissues and into their fluids, as these offer a better nourishing nest for the microbes. Compare König's with Roser's views. Roser ridicules the chink-fungi as the producers of the gangrene *in situ* and from without. And, agreeing with this, König gives them a nidus within from which to operate. This is but a repetition of what I long ago stated in an address before the Academy of Surgery in this city.

The reason that a sick man is at a disadvantage as compared with the well man is that the former is a harbor for the products of disease (molecular necrosis). These products are the food of the bacilli, and where the food is, *there* they go. They do not differ in this from all other organized creatures from man to microbe. How far they are the *causes* of disease is the business of the mycologist to find out. But little as yet has been established as a *certainty*, and, therefore, it is all the more incumbent, in practice, to guard against their possible presence and specific power. König thinks that capital amputations had better be let alone so long as the urine is rich in sugar. He also says there are cases in which the surgeon must be the judge. It may be worse to refrain from amputation, and thus let the patient contend with two serious conditions, the disease and the gangrene.

Thus you see that up to this time but little has been added to our real knowledge of diabetic gangrene since 1852, the days of Marchal and Hodgkin. The disease was there, the theories were there, the cautions and advice and treatment. All were present but the bacillus, and he was lurking in the dark. The surprising thing is that, as in the expression already quoted, the interesting and important subject should have twice "been almost totally lost from view."

After reading the review in *Schmidt*, I got the number of the *Centralblatt* which contains König's paper and read it. I have already taken most of the important parts from the reviewer. König has evidently gone over some of the same historical ground that I have done. He gives the French great credit for their researches and papers and reports. He quotes one of the latest French observers, P. Redard, upon "De la glykosurie éphémère dans les affections chirurgicales" (*Revue de Chirurgie*, 1886, No. 8 and No. 9, S). He reports two most interesting cases, one aged seventy, and one forty,

occurring in 1886, both having diabetic gangrene and atheromatous arteries. He amputated a thigh in each case, under strict antisepsis. Both recovered rapidly, and there was a remarkable diminution of the sugar in both, and at times it wholly disappeared. He argues to himself in this quaint way: "During the past year I took the knife in hand, for I said to myself, 'if thou continuest to treat the case in this way (the expectant), the old man, upon whom his family depends, will surely go to the ground; to be sure, he may also go to the ground after the amputation, but possibly he may live if antisepsis is strictly carried out.'" And live he did. He then issues his dictum, a process of which our friends abroad seem to be very fond: "When in diabetic gangrene, in spite of antidiabetic treatment constitutionally and antiseptic treatment locally, the general diabetic symptoms and the local phlegmonous appearances do not disappear or ameliorate, and a further perseverance in the treatment simply increases the danger for the patient, then a radical operation, in order to try to save the patient's life, must be performed. These operations will, as a rule, be amputations."

We will now leave the history and literature of diabetic gangrene and take up the records of experience with a few practitioners here at home.

I think any fair-minded person would say that, if we can develop so much in such a limited range of inquiry and in such a short time, and then ask himself what might be found out by further inquiry, not only among ourselves but throughout the country, diabetic gangrene is certainly something more than a mere coincidence of the disease diabetes. I sent out a small number of inquiries to physicians and surgeons in our city, selecting those whom I thought would know most about the matter, and also made personal inquiries of some. The questions were: 1. How many cases of diabetic gangrene have come under your notice or treatment? 2. What was the social standing of the patients—wealthy, medium, poor, hospital, or private—their ages and sex? The next question would appear to be rather a side issue, but it was made, in passing, to ascertain whether what is almost universally stated about diabetes is legendary, or is the result of carefully collated observation; it also bears upon gangrene of the pulmonary organs—it is: 3. How many of *all* of your diabetics had consumption, or died with it, and was there anything like gangrene of the lungs?

I received thirty answers, including myself; of these, seven had seen no gangrene. They were Tyson, Longstreth, A. V. Meigs,

Hutchinson, Packard, Sinkler, Keen. Twenty-five reported 64 cases, viz.: T. G. Morton 13, Da Costa 5, Hunt 5, Agnew 6, J. C. Wilson 3, S. Solis Cohen 3 (two of them in consultation with other practitioners), Dr. Brush 4 (one case intermittent). D. F. Woods, J. H. Brinton, S. W. Gross, E. L. Duer, Murray Cheston, W. A. Edwards, J. W. Hearn, 2 each. John Ashhurst, Jr., Elwood Wilson, L. K. Baldwin, W. Osler, James Darrach, A. Fricke, W. F. Atlee, C. B. Penrose, J. H. Musser, W. B. Hopkins, T. K. Morton, 1 case each.

I was as particular as possible to eliminate double reporting; for example, cases seen in consultation, thus, D. Brinton saw one with Dr. Mitchell and myself; it is reported as one of my cases. Dr. C. B. Penrose is entitled to one more than above given, which one, as you have heard, was the cause of this paper, but it went into the hospital and so it appears in Dr. Morton's record. Dr. Weir Mitchell has seen several cases, I know, but having just returned from abroad he had no time to give a verified statement.

I was also particular that the cases should be known by actual examination and record to be diabetic. Thus, Dr. Morton at first answered me that he had seen twenty or twenty-five cases, not knowing my object. I have no doubt that he has seen that number, for he and I have had our attention drawn to this matter for years, but he actually verified the thirteen in his list. Dr. T. R. Neilson was certain he had two cases to report from the Episcopal Hospital, but he found no record of sugar, so I rejected them. I mention these facts to illustrate the care that has been taken.

The ages, where given, were: 1 between 30 and 40; 2 between 40 and 50; 11, 50 and 60; 12, 60 and 70; 10, 70 and 80; 2, 80 and 90. One exceptional case of Morton's, a diabetic aged nineteen, in whom gangrenous sloughing took place after a needle operation for cataract, is down, and one of S. Solis Cohen's cases was a young female. Of the sexes given, 24 were females and 25 males. Of social standing, where given, 16 were wealthy, 23 medium, 9 poor, and of these 6 were in hospital. Dr. Brush reports a most interesting case of a female diabetic aged forty, a lunatic. She had large ecchymoses on her limbs which became gangrenous; she died. The autopsy revealed a gumma the size of a large pea in the floor of the fourth ventricle. The seats of gangrene, where reported, are: Lower extremities—below the knee 37, thigh and buttock 2; nucha (not ordinary carbuncle) 2, external genitals in female 1, lungs 3, fingers 3, back 1, eyes 1.

Had I allowed myself to include ordinary carbuncles and boils in

the gangrenes, to which class they belong, the list would have been greatly increased.

We will now take up the third question: How many diabetics have consumption or die of it? Is it a legend?

Marchal says he has known of but few diabetics to die of consumption, but he is rather inclined to adopt the general view.

A pamphlet published at Oxford in 1745, called "A Mechanical Inquiry into the Nature, Causes, Seat, and Cure of Diabetes, with an Explication of the most remarkable Symptoms," says, if the patient be "too far advanced by a neglect of proper remedies, the person so affected in reality dies of a consumption."

Here are the answers to the third question. Dr. Tyson has notes of 55 cases in private practice since 1884. Of these, 18 have died, 4 of consumption.

Dr. Longstreth says a very large proportion die of pulmonary complications called consumption.

Dr. A. V. Meigs has notes of 5 deaths from diabetes, none from consumption, nor does he know of any consumption in those diabetics who have passed into other hands, nor, as I understand, of any in his father's practice. Dr. James H. Hutchinson remembers 1 diabetic who died of consumption. Dr. Packard remembers none. Dr. J. Ashhurst, Jr., does not remember a consumptive. Dr. Sinkler: none of his few cases died of consumption. Dr. Da Costa does not remember a case of gangrene of the lungs, but has seen a sufficient number die of phthisis as to believe in the generally held opinion. Dr. Agnew has seen no consumption, one of gangrene of the lungs. Dr. Elwood Wilson does not remember a death from consumption.

Dr. J. C. Wilson cannot answer as to consumption, thinks it not so common as supposed; has seen one case of gangrene of lungs. Dr. D. F. Woods has had no consumption deaths. Dr. L. K. Baldwin, one case complicated with consumption. Dr. Osler, two died of consumption, one of gangrene of lungs. Dr. Darrach, no consumption. Dr. S. W. Gross, none; Dr. Keen, none; Dr. Albert Fricke, none; Dr. J. H. Brinton, none; Dr. Hearn, none; Dr. Hunt remembers one poor woman in the hospital who was said to have consumption with diabetes. Dr. Brush, one phthisis death, and reports one lady of seventy-one, three of whose family had consumption; she escaped it. Dr. F. G. Morton, one; Dr. W. A. Edwards, none; Dr. Murray Cheston, six cases, no consumption; Dr. W. F. Atlee, none; Dr. T. S. K. Morton, none; Dr. Musser says he knows the cause of death in nine cases—none of phthisis.

Thus among all the diabetics noted by the practitioners mentioned, and we do not know how many are included, but certainly the 55 of Tyson, the 64 of my collection, the 9 of Musser, and 16 non-gangrenous ones specified by 7 others, in all 144, we find but 11 deaths from phthisis. And yet Dr. Thomas S. K. Morton, in an essay on diabetes, has somewhere picked up a statement, from an authority whose name he has missed, that 43 per cent. of diabetics are killed by phthisis sooner or later. Roberts, 1885, says that one-half of them die with cough, catarrh, phthisis, and other lung complications, when prolonged to the third year, and Aiken quoting him, evidently in mistake, says to first year. Dr. George B. Wood says, "In the great majority of cases the patients die of phthisis." Drs. Da Costa and Longstreth, whose opinions are entitled to great weight, make general statements in their answers; Dr. Longstreth cautiously stating it is *called* consumption. From a conversation with Dr. W. Pepper, who gives no return, he adopts the consumption view, and Dr. J. Cheston Morris coincides.

S. Solis Cohen says: "I cannot find accurate statistics as to consumption. Think at least one-third of the cases that I have seen died of pulmonary affections." Griesinger, quoted by Niemeyer, says "one-half of the cases die of phthisis." Watson says, "some think phthisis universal in diabetes, but it is not so." Flint, quoting Ogle, reports fourteen cases, with deaths from scrofulous or tubercular disease in seven of them. Niemeyer says "that pulmonary tuberculosis hastens the fatal issue." What one of latest authority, C. Hilton Fagge (1886), says, is important. "Diabetes is frequent cause of a phthisis" (almost the 1745 expression), which is peculiarly pneumonic in character. Its relation to ordinary pulmonic disease is still doubtful," and after giving certain facts he says, "hence it supports very strongly the opinion that the pulmonary affection in the disease is not of a tubercular origin." He kept notes of the diabetic deaths in Guy's Hospital and in twenty years out of 40 such deaths, 17 died of phthisis. You will notice how indefinite and general some of the statements above given are, without figures to sustain them. Blau, in his review in the late number of *Schmidt's Jahrbuch*, already quoted as to gangrene under the head of "diseases of the lungs in diabetics," says, in substance, "that the question whether so-called diabetic phthisis is the same as ordinary tubercular disease of the lungs is only to be settled by the proved presence in both of the same bacillus." Authorities, Inmérman, Rüttimeyer, von Merkel, and von Leyden, are quoted as having observed absolute differences between the two diseases both

from examinations of sputa and also by post-mortem. A case is given in which during life the patient had all the symptoms of tubercular phthisis. Except that bacilli were not found in the sputum, and at the autopsy the appearances were totally different from those found in that disease, and these appearances are noted in the text. The bacillus tuberculosis was nowhere found. A case having almost the same post-mortem appearances as this one is reported by Da Costa, in the *Philadelphia Medical and Surgical Reporter*, vol. i. page 8, January, 1887. The bacillus, as in the preceding case, was absent.

This record, considering the large number of consumptives in communities like ours, would seem to show that the cases in point *are consumptives with supervening diabetes, and not diabetics with supervening consumption*. I leave the question for wiser heads to determine. Diabetics die, as my inquiries and experience confirm, with coma, oedema of the lungs, and exhaustion.

I said I would not trouble you with the minute particulars of my own cases. To do it, would not add to the general knowledge of the subject, but I will sum them up and relate, I think, some interesting points. I have 9 cases to speak of, 5 of whom were gangrenous, and 3 rapidly advancing toward it when death overtook them. One was peculiar and unverified; all are dead; one was in medium circumstances, all the others decidedly wealthy. The ages ranged from 50 to 93, 4 of them being above 70; 5 were women, 4 men. In none of them was the classical emaciation present at any time. The disease was intermittent in two. The urine in one of these cases would range as low as 1010 specific gravity, with slight traces of sugar, and then advance to 1030-1035 with evidence of abundance of it. I took a specimen of this low gravity urine to Dr. Casper Wister, of the Mutual Life Insurance Company of New York. He tested it himself and was much surprised, and concluded not to accept statements of "no sugar" founded upon specific gravity alone. Another case also ranged from low to high at varying times, but not so marked as the first.

This teaches us not to be too sure in saying, as we all often do, "there's no use looking for sugar in that," when the gravity is 1020 and under. Austin Flint, Jr., reports a diabetic case with the gravity of 1011½. The seats of the gangrene in five of my cases were, foot and leg below knee 3, thigh and buttock 1, nucha (not ordinary carbuncle) 1.

Gangrenes, as a rule, are generally of the soft or humid kind. This, however, depends much upon the part involved. Where the tissues are succulent, the gangrene will be also of that character;

where they are composed mostly of skin, tendon, and bone, they will approach the senile gangrenes in appearance. The remark made by Holmes Coote is also applicable. He, speaking of the terms used in the descriptions of gangrene in general, as dry, moist, etc., says, "when death of a part takes place rapidly, the vessels still contain blood and the usual fluids, and the mortified parts are moist and soft. When, on the other hand, the death is slower, there is usually a deficiency of the supply of blood; the vessels become empty and the part hardens and withers." There is this distinctive difference between the diabetic and the senile gangrenes according to my observation. The former rarely or never present the clear-cut line of demarcation between the dead and living parts that is characteristic of the latter. This fact, with a want of the decided dryness and shrivelling of the senile variety, should suggest the diabetic form, but in any case the urine should be examined.

I have this interesting observation to make about one patient :

a lady, aged ninety-three years, who did not have gangrene. This past summer she was in more than usual good health. I know positively she had no diabetes until shortly before her death; not only from the want of rational symptoms, but also from recent examining of the urine. I went with her to Newport in June, and left her there. In passing through Newport in the latter part of July, I saw her; she was perfectly well, and her delight was to drive twice a day. I was at Bar Harbor in August, and received a telegram asking me to come at once to see her at Newport. She was dead before I arrived, and I learned from Dr. Cleveland, of New York, who attended her, that she was sick but eight days, and had developed an *acute* diabetes, which rapidly proved fatal. I had no hesitation in saying, that had she survived the first fierceness of the attack, she would have had to contend with gangrene. The opinion was given, not because of her age, but because of the diabetes.

Sugar in the urine has been developed by falls upon the head, and also in certain forms of apoplexies, but I have just made a, to me, most interesting observation. I wish to know if any of you have made one like it, for I find none such reported.

In January, 1885, a wealthy gentleman, a long-time patient of mine, of most vigorous constitution, then seventy-six years of age, had an apoplectic seizure, from which he reacted, and finally settled down into a chronic semi-paralytic. On the 9th of this November, 1888, in the evening, I was suddenly summoned to see him by his son-in-law, a physician. He was comatose, face very much flushed, temperature 103°, pulse 120, and had Cheyne-Stokes respiration. There was no increase of paralysis of the extremities. Basic effusion was diagnosed. Under treatment he improved, and was very much better by morning.

His urine during his sickness had been repeatedly examined, and, with the

exception, at times, of slight traces of albumin, there was nothing abnormal. On my morning visit, mindful of the symptoms of the night before, I proposed an immediate examination of the urine. This was done, and decided sugar reactions were produced by fresh Fehling solution.

Here was auto-physiology. Temporary pressure upon, and disturbance of the respiratory centres, and also pressure upon the diabetic regions of Bernard. As the effusion disappeared with the mending of the patient's condition, the sugar has gone with it, and now the tests give no traces of it. It will be interesting in this case, if the patient survives, to note both as to sugar and as to gangrene.

I had written thus about this case, when I had occasion to make another note. I saw the patient daily for four or five days, when it looked as though matters were about to resume their old course, and I made the next appointment for two days ahead. But on the 15th I was summoned again. The patient was in deep coma, breathing 60 per minute, pulse 150. *The urine gave sugar reactions more decided than before.* Respiration could be stopped by reflex at once—that is, by any peripheral irritation about the mouth or thorax. This would occur on an attempt to give liquids, then after a few automatic adjustments, the breathing would go on as rapidly as before. Within two hours death took place. There was no filling of the bronchi with mucus. The patient simply stopped breathing. Pressure on the pneumogastric centres was profound. It was a quick and permanent application of the air-brakes.

In practice we all have our puzzling cases. Some we clear up during the life of the patient, while others die, and, it may be, not until long afterward does the knowledge come to us of what probably was the matter. Some similar case, or some reading or discourse may give us light. I recall one such case in the direction of the present paper. A distinguished, wealthy lawyer was attacked with an obscure disease. It was rapidly fatal. Dr. James Darrach was the physician, and I was sent for in consultation. It is not necessary to give the details. I cannot remember whether the urine was examined; certainly, I think, not for sugar. Symptoms of sepsis were marked, and among the incidents there was enormous swelling of the abdominal walls, both anteriorly and laterally. I made free and deep incisions into the flanks, and from the cellular tissue mephitic gases and fluids, like those that flow from moist gangrenes, came in abundance. I think, in the light of what has been developed in my researches, that that patient died from an acute attack of diabetic gangrene.

There was no consumption, or even a suggestion of it, in *any* diabetic of whatever kind that I have seen, except the one I vaguely remember, which I have already spoken of as being in the hospital when I was resident. I now submit, from what we have heard, whether among all the gangrenes mentioned in books and indexes, viz., traumatic, hospital, senile, symmetrical, spontaneous, puerperal, visceral, infantile, congenital, cutaneous, mephitic, spreading, ex-

anæmic, arterial, static, dry, wet, moist, humid, white, etc., the much-neglected diabetic gangrene should not be included? We have seen that *diabetic* gangrene makes, with good reason, higher pathological claims to notice than most of the kinds above given.

It is rash to make assertions. I, however, will say I should not be surprised to find, after thorough investigation, that in *numbers*, in civil practice, diabetic gangrenes would be found to hold the second place, traumatic gangrenes, including those from frost-bite, burns, and scalds, only exceeding them.

A few remarks upon the proximate and remote causes of diabetes which also have a bearing upon the production of gangrene. We have seen that diabetes is no disease of the poor in general. Drs. Tyson, Morton, and Darrach will give you some interesting facts about this.¹ I also have a good instance to add, illustrating the enchantment of distance even in science. Last Sunday I was speaking with Prof. Penrose on this matter of the poor and the rich, when he said, "And yet I don't know, Hunt; you remember the cases that used to be in the hospital when we were residents, and the work done in studying them under Drs. Wood and Pepper?" I remembered all that, but did not remember the number of cases. I kept my own counsel, and next day I went for the record. The number of diabetics, as such, that were admitted into the hospital during Dr. Penrose's residency, 1851-53, two years, were just *three*; so, in the lapse of time, much work over a few cases is translated into the same work distributed over many cases.

From 1842 to 1888 inclusive, a period of forty-seven years, *fifty-nine* cases of diabetes were admitted into the hospital, an average of 1.28 cases per year. From 1842 to 1848 there was not a case; from 1858 to 1869 there was not a case, and in the first part of this time the Pennsylvania Hospital was practically the only hospital in our city for the respectable poor to go for treatment. Thus, from the wealthy and middle classes of this community, I have brought to light more than twice as many cases of diabetes, most of them recent, as have been treated in the Pennsylvania Hospital for fifty years.

¹ In the discussion which followed this paper Dr. Tyson said: "In regard to the infrequency of diabetes among the poor no better proof could be given than the fact that in the Philadelphia Hospital, in which more than a thousand patients are present at one time, it will often be impossible for weeks to get a case for lecture." Dr. Morton also stated: "An inquiry recently made of the superintendents of our State hospitals for the insane shows that although more than twenty thousand patients belonging to the indigent class have been under the care of the present medical officers of these hospitals, there has not, it seems, been a single case of diabetic gangrene in the institutions at Harrisburg, Dixmont, Danville, Norristown, or Warren." Dr. James Darrach said: "Dr. Hunt has mentioned that diabetes is a disease of the well-to-do, and referred to the rarity of the disease in hospital patients and among the poor. This would appear to be corroborated by the statement of Dr. Jordas, who states that in an aggregate of 22,735 admissions into, I think, four hospitals in Lisbon, there was not one case of diabetes; and of 5700 deaths in 1862, four only were from this cause."

Diabetes seems, in its affinities, to be more nearly allied to gout than to phthisis. One of Dr. Cheston's gangrene patients was a man over six feet high, weighing 250 pounds. He was a waiter in a private family, and surrounded with all the accessories of wealth. I could not establish that excess in the use of wine or strong drink had much, if anything, to do with the production of diabetes. A diabetic drunkard is rare; I have never seen one. I think, however, that over-feeding plays a much more important part as a proximate cause. Aside from the boulimia that is often an accompaniment of the disease, it will be found that most diabetics are over-eaters in habit. I know that most of my patients were, to say the least, good feeders, and some of them excessive ones, and one was noted in this way. Well-to-do people, in times of peace and plenty, eat too much. The laboring classes may eat as much in quantity, but they work it off. Excess in food clogs, excess in drink crazes; so the former habit has the advantage in morals, but which kills most is a question.

I shall only glance at the theories of diabetes. Faults of the nervous, vascular, and visceral systems have been, respectively by some, and *all* together by others, considered to be at the bottom of the trouble. I incline to deranged vaso-motor effects (stasis or paralysis of the vessels, with or without atheroma or arterial sclerosis) as most explanatory. What better fact could we wish to sustain this position than the influence of the disease on virility, a condition almost absolutely dependent upon normal vaso-motor function? Men with diabetes are mostly impotent; Marchal says, always so. He gives some strange cases of marital infelicities, such as unfortunate charges of infidelity by wives against their husbands, when really the poor fellows were helpless diabetics. One of these is described as a veritable athlete, and he was an example of the fact that in this disease great and peculiar strength in one direction may for a time coexist with great and peculiar weakness in another.

The knowledge of diabetes is ancient, and, in looking over the old records I thought that I might stumble on one of diabetic gangrene, but in this I was disappointed.¹

¹ Coincident with the reading of the proof of this paper, I received (December 6, 1888) a copy of the *Berliner klinische Wochenschrift*, No. 47, November 19, 1888. It contains the first part of an article by Dr. Max Schüller, of Berlin, called "Ein Beitrag zur Kenntnisse der phlegmonösen und gangränösen Prozesse bei Diabetes." The author also intimates that gangrene, etc., is more than a mere coincidence in diabetes. He says: "While many cases of glycosuria, as, for example, those following experimental researches upon and injuries of the central nervous system, have found an essential clearing up, the relation between pus formations, furuncle, carbuncle, gangrenous process, and glycosuria is still quite dark. The view that these cases are essentially only complications of an unrecognized diabetes has still its adherents. I now have nothing new to offer as explanatory, and will consider this part of the subject no further."

DISCUSSION.

DR. THOMAS G. MORTON, in opening the discussion, by invitation of the Directors, said: Thirteen cases of diabetic gangrene have come under my observation, generally in consultation. In all instances the disease involved some part of the lower extremity, generally originating in one or more of the toes, or about the dorsum of the foot. Many years ago I witnessed a needle operation for cataract in a young girl who was known to be markedly diabetic; sloughing and gangrene of the orbital contents resulted, and death by coma occurred on the third day.

With some few exceptions, the patients I have seen with gangrene in the course of diabetes, have been in good circumstances. I refer to this because it has been suggested that this disease more frequently occurs among those who are surrounded by the comforts and luxuries of life, and not among the poor.

An inquiry recently made of the superintendents of our State hospitals for the insane shows that although more than twenty thousand patients belonging to the indigent class have been under the care of the present medical officers of these hospitals, there has not, it seems, been a single case of diabetic gangrene in the institutions at Harrisburg, Dixmont, Danville, Norristown, or Warren.

Gangrene in diabetes, in the cases I have seen, has generally started in a local inflammation, resulting from some very trivial cause; on several occasions I have known it to follow the operation of cutting a corn. The occurrence of gangrene in diabetes seems to be a certain indication of great nervous exhaustion, and of a general condition most critical. Although I have observed gangrene as a result of diabetic condition in parts of the body other than the extremities, notably in diabetic carbuncular disease, yet gangrene appears more often in the toes and feet, where there is but a moderate amount of cellular tissue, and where the circulation in such cases is apt to be feeble.

The surgical treatment of this form of gangrene can generally be but palliative, most of the cases I have seen have been promptly fatal. The ordinary principles of surgical treatment should be observed; all tension of parts ought to be relieved by deep, free incisions, which, by relaxing and draining the tissues, permit a better circulation; indeed, I have often arrested the rapid march of gangrene by such treatment. When a line of demarcation forms, which may occasionally happen, the question of amputation may arise. Occasionally the gangrene of diabetes is associated with most excruciating pain, not only in the affected limb, but apparently in the gangrenous parts. I have had two such cases, both females, and in each I performed nerve section, with partial relief in one, and with complete success in the other. In the first, I sectioned the posterior tibial, in the other the sciatic. The latter case I saw in consultation with the late Dr. L. M. Service, of Belmont, near the Falls of Schuylkill; the patient was seventy years of age, a large portion of the foot was already gangrenous, the pain in the foot and leg as far as the knee was excessive. I sectioned the sciatic in the middle of the thigh; the gangrene, which was not apparently hastened or influenced by the

operation, very slowly extended for some weeks, until a point about four inches above the ankle was reached, where a line of demarcation formed. Subsequently, Dr. Service, Jr., removed all the gangrenous parts without encroaching upon the living tissues. The patient improved, was able to move about her room with comfort, and with entire freedom from pain; eight months afterward she died from an attack of acute dysentery.

DR. JOHN ASHHURST, JR.: In justice to the writers of text-books it should be said that an index does not always represent all that is in the book. In my own smaller work I have alluded to diabetes as among the causes predisposing to carbunculous affections, and in the *International Encyclopædia*, in the article by Prof. Verneuil upon the "Reciprocal Effects of Constitutional Conditions and Injuries," Dr. Hunt will find a much more elaborate study of the relations of diabetes to gangrene than in the comparatively short article of Prof. Moore. Of course, we have been familiar for years with the tendency of diabetics to suffer from gangrenous affections, such as carbuncle and, though not so characteristic, furuncle; and we have also known that intracranial injuries may give rise to diabetes, or rather to glycosuria. Verneuil considers the question of sugar in the urine from irritation of the floor of the fourth ventricle, and shows that it may be a temporary condition, the sugar disappearing as recovery from the injury takes place, and without leaving permanent results.

In many cases of diabetic gangrene, as Dr. Hunt points out, the quantity of sugar in the urine at different periods varies; it may, in fact, be absent at times, and thus even careful examination of the urine during such intervals may fail to reveal the condition. I have but one recorded instance of diabetic gangrene in my personal experience. The patient was a man of middle age, sent to the hospital with strangulated hernia of some four or five days' duration. The attending physician informed us that the man had long been a diabetic. Operation was deemed imperative, and was undertaken. There was but a small patch of gangrene in the bowel, which was left in the wound after relieving the constriction, so as to allow the formation of an artificial anus. Next day not only the bowel but the edges of the wound and the surrounding tissues were gangrenous, and death rapidly ensued. It was a case, then, of rapid moist gangrene, following a comparatively small incision.

I have seen other cases, which I believe were instances of diabetic gangrene, though this was not demonstrated by an examination of the urine, that bear out Dr. Morton's statement of the liability for this condition to be precipitated by slight injuries, such as the rubbing of a boot or cutting a corn. The gangrene is moist rather than dry, which may be a valuable factor in diagnosis. Whenever we see spontaneous gangrene of the moist variety, it should at least excite the suspicion of diabetes.

There are, however, other influences which predispose to spontaneous gangrene, the most common, perhaps, being alcoholism. Verneuil refers to this fact, and says that in what he calls "alcohol-diabetes" gangrene is particularly apt to occur, as there are then two predisposing causes acting at the same time.

Another cause of gangrene after amputations and other severe operations, as surgeons are aware, is the presence of certain forms of Bright's disease, the granular kidney especially. In these cases diabetes may sometimes co-

exist, and the presence of sugar fail to be recognized, simply because it is not looked for.

As to the treatment of diabetic gangrene, locally, the less done, as a rule, the better. I would go further than Dr. Morton, and would wait not merely for the line of demarcation but for that of separation, which may appear some days or even weeks later than the former, before proceeding to amputate. In the majority of cases of spontaneous gangrene, diabetic or not, it is the better practice to trim away dead parts with forceps and scissors, rather than to attempt a radical operation. I have seen, after amputation, rapid return of the gangrene, spreading extensively and causing death.

Constitutionally, it is a suggestive fact that the one remedy of greatest value in spontaneous gangrene of any kind is a remedy which has obtained a deserved reputation in the management of diabetes, *i. e.*, opium. Opium in doses of one grain or one grain and a half, night and morning, or larger doses if needed, will often show its good effect in tending to arrest the gangrene in a short time. In many cases of spreading ulceration opium is also of value.

For the treatment of diabetic gangrene then, opium internally and the less heroic treatment of the affected part seem to me to offer the best prospect.

DR. JAMES TYSON: Notwithstanding the exhibit made in the exhaustive paper of Dr. Hunt, I cannot but think that diabetic gangrene is a rare disease. Taking my own experience, referred to by Dr. Hunt, of fifty-five recorded cases in private practice since 1884, and probably at least twenty-five more prior to that date not so accurately recorded, and realizing, as I always have, its possible occurrence, the fact that not a single case has occurred under my observation is a significant one. It is to be remembered, of course, that many of these cases passed from my notice before they terminated. Dr. Hunt has asked for a parallel to his case of paralysis, etc. I cannot give an exact parallel, but one sufficiently so to justify an allusion in the same connection. A gentleman of multiplied business and financial interests came under my care for diabetes, when he was fifty-two years old. Three years later there occurred a sudden hemiplegia. Within a few days after the paralysis occurred, the glycosuria disappeared and has not returned, though nearly two years have since elapsed. The percentage of sugar had been at one time as much as seven per cent., and was constantly two and three per cent.

In regard to the infrequency of diabetes among the poor no better proof could be given than the fact that in the Philadelphia Hospital, where more than a thousand patients are present at one time, it will often be impossible for weeks to get a case for lecture.

Dr. Morton has alluded to the extreme pain in diabetic gangrene. I have observed the same thing in gangrene associated with granular kidney. I scarcely think it should be regarded as peculiar to the gangrene of diabetes.

DR. JAMES DARRACH: I have seen but one case of gangrene associated with diabetes, the one noted by Dr. Hunt in his admirable and exhaustive paper delivered to the Society this evening. Two others of the legs and two of internal gangrene have also come under my notice in my practice. Those of the legs were in women over seventy years of age, and while I cannot recollect about the condition of the urine in these cases, from my custom of examining the urine in old people, for sugar, it having been stated that it

was not an unusual thing to find it in the urine of the aged, I doubt the probability of sugar escaping my notice.

Dr. Hunt has mentioned that diabetes is a disease of the well-to-do, and referred to the rarity of the disease in hospital patients and among the poor. This would appear to be corroborated by the statement of Dr. Jordas, who writes that in an aggregate of 22,735 admissions into, I think, four hospitals in Lisbon, there was not one case of diabetes, and of 5700 deaths, in 1862 four only were from this cause. Perhaps climate may, in a measure, account for this small proportion of diabetes, the inhabitants of Southern countries being considered by some writers not so liable to this disease; and I might add that as some malcondition of the nervous system holds a prominent position in the etiology of diabetes, we might find an explanation of the fact that the inhabitants of the sunny South are not exposed to the strain upon that part of their organization, as are those who live in countries where the brain is taxed to the utmost.

Dr. Hunt has spoken of the more palpable and well-recognized forms of gangrene. Dr. Wm. H. Dickinson has reported that in the autopsies of five cases of diabetes he has found peculiar morbid changes in the cerebro-spinal system, consisting in dilatation of the arteries and a degeneration of the nervous matter at certain points external to them occasioning destruction and excavation of the tissue around the vessel. Kaposi describes a peculiar form of inflammatory gangrene of the skin, which I suggest might be owing—as has been described as the pathological condition in shingles—to necrosis of the terminal nerve filaments. I mention these as a probable addition to gangrenous affections in diabetes, which I believe Dr. Hunt does not refer to in his paper, and would suggest that the nervous system should be examined more than has been done in autopsies of this disease.

I would inquire of Dr. Cohen whether he included in his statement cases with small amounts of sugar, and whether the sugar was established by the cupric oxide test alone. I feel interested, as from my own examinations I have been led to doubt the existence of this element in normal urine; the existence of sugar has been supposed from the reduction of the oxide of copper. This reaction is accounted for by the uric acid and kreatinin. I would like to ask Dr. Tyson how far his examinations sustain this view.

DR. W. OSLER: I think that Dr. Hunt has underrated the proportion of cases of diabetes that die with pulmonary complications. In my own experience of six autopsies there were three—two of consumption and one of gangrene.

Frerichs, in his important monograph, which contains a study of four hundred cases, states that nearly one-half of all diabetics die of lung disease.

There are three forms: The most common is a rapidly fatal lobar pneumonia, very liable to terminate in gangrene. The second is a broncho-pneumonia, which is still more liable to be complicated with gangrene. Thirdly, and most commonly, there is a genuine consumption which is tuberculous, as demonstrated by the presence of the bacillus.

DR. NANCREDE: I would like to add another case to the list, which I had supposed was one of those referred to by Dr. Neilson, but it appears not; it was one of moist gangrene with large amounts of sugar in the urine, where

the disease started in the fourth toe. In the other case, which Dr. Neilson mentioned to Dr. Hunt, I amputated the thigh high up for moist gangrene *not* due to diabetes. It illustrates the futility of amputating anywhere near the site of disease, for the artery was thrombosed to the groin. Unless the operation be done above the knee for gangrene of the foot, we are almost certain to have recurrence in the wound with rapid spread of the disease and death.

The practical outcome of this discussion should be to lay down a rule not to undertake any serious operation unless the urine has been tested for sugar, as well as for albumin. Since I assisted at an amputation of the breast in the practice of a friend, in which the urine had been found free from albumin prior to operation, but after the amputation the urine was found to be loaded with sugar, I have pursued this rule. Perhaps if the urinary examination included testing for sugar, as well as albumin, there would be fewer unexpectedly fatal terminations to operations and more cases of diabetes recognized.

DR. J. WILLIAM WHITE: If Dr. Hunt had been able to elicit from his correspondents the facts as to the coexistence or absence of certain other conditions likely to give rise to gangrene, we could better estimate the relative etiological importance of diabetes in these cases. Thus, in one of Dr. Agnew's cases which I had the opportunity of seeing, and upon whom I performed a knee-joint amputation, the subject was a man of fifty-two years, with chronic alcoholism and with marked atheromatous changes in the vessels. In this case we had, therefore, two conditions, either of which was competent to produce gangrene without the concurrent diabetes. Dr. Hunt's admirable and otherwise exhaustive paper would, perhaps, have been more conclusive had it been possible to include these points.

DR. S. SOLIS-COHEN: Dr. Nancrede's remarks suggest an explanation of the comparative meagreness of hospital records of diabetes, and of its supposed rarity among the poorer classes. Urinary analysis is not as general or as thorough as it ought to be. In the Medical Clinic of Jefferson Medical College Hospital, where it is the invariable rule to examine the urine of every patient, no matter how trifling the complaint, not a year passes that one or more cases of unsuspected diabetes, or at least glycosuria, are not discovered. Further, I would suggest that out-patient clinics or dispensaries, and not hospital wards, are the places to search for public records of diabetics of the poorer class. The Jefferson Clinic has, I suppose, from five to ten or more cases of diabetes annually, in a service of about four thousand new cases. At the Philadelphia Polyclinic, during nine months of this year, between three hundred and four hundred patients have been treated in the Medical Department, of whom three have been cases of diabetes. This large proportion is to be accounted for by the greater number of special clinics in the same building, reducing the attendance at the general clinic. Taking the entire non-surgical service of the institution, the proportion of diabetics would be reduced somewhat below that of the Jefferson clinic. Of course, in institutions like these, consultation cases increase the average of rare diseases of all kinds above that of ordinary dispensaries. Still, considering the aggregate number of diabetics at these two clinics, of which I have personal knowledge, and remembering that urinary examinations are not as thorough as they should be in private practice among the poor and

that diabetics, as a rule, are walking cases until near the last; and, therefore, not to be looked for in hospital wards, I must doubt the force of Dr. Hunt's social distinction.

Dr. Cohen replied to Dr. Darrach that dependence was never placed upon a single test, and there was little probability that uric acid and kreatinine had been mistaken for sugar. One disadvantage of dispensary practice in these chronic cases was the inability to keep patients under observation for more than a short time. They wandered elsewhere, and might possibly be doubly or trebly reported.

DR. THOMAS S. K. MORTON: I should like to make a more especial point of what the practice of antiseptics enables the surgeon to accomplish in dealing not only with diabetes, but with all sorts and conditions of depraved system when upon them have been engrafted complications which, with modern methods of wound treatment, are at least entitled to have some attempt made for their relief.

Under this heading would be included diabetes, Bright's disease, the graver infectious and contagious diseases, ataxia, and all other serious nutritional alterations dependent upon nerve or other change.

Now the dangers principally to be dreaded in undertaking operations in persons subject to such diseases are those of *infection*. Little need be feared until this dire calamity has occurred. The most innocent forms of senile or other gangrene may at any time become so infected and change their nature to one of greatest malignancy. On the other hand, even large areas of necrotic tissue will not putrefy nor infect the system until bacterial decomposition takes place in them.

I am convinced that infected gangrene existing without skin lesion usually has derived that complication from noxious bacteria lying deep in the various appendages of the skin. Hence the evident advisability of protecting a part about to become sphacelated by antiseptic covering; preferably by a carbolic or combined carbolic and sublimate dressing, for in such cases carbolic acid is a necessary constituent of the dressing that the fat and other skin glands may be deeply penetrated and disinfected by its influence—a property not possessed by sublimate and other disinfectants.

When infection takes place in a case of one of the above-mentioned diseases, the already depraved tissues are powerless to resist the onslaughts of bacteria, and frightful pillage and destruction are the result. Especially is the system unable to cope with the attacks of bacteria when diabetes is present, for then is provided in addition to the other favorite pabula of bacteria, glucose, which, in tissue solution, affords a most capital medium for the culture and dissemination of poisonous and tissue-destroying microorganisms.

We must then have ever in mind that in dealing with surgical complications of any of the diseases which have been quoted, but more especially in the case of diabetes, our object should be:

1. To prevent infection of a part about to become gangrenous, by instituting disinfection and subsequent protection; and, above and beyond all, never to apply a poultice.

2. Only to interfere surgically when absolutely necessary.

3. To operate only with thorough and powerful antiseptics—asepsis will never answer in these cases.

4. To relieve tension absolutely, and to eradicate as much of the diseased tissues as possible, and to disinfect thoroughly and render sterile all that cannot be so treated; for unless this be accomplished, a favorable result, or arrest of the destructive process, cannot be expected.

5. In suturing or dressing, to make no great traction upon any portion of the wound or its surroundings, and to provide most liberally for drainage.

6. To dress the wound in such a way as to prohibit subsequent infection, and to redress it upon the slightest indication.

7. To remember that non-union and non-healing will probably result, but that we may be bold in doing what seems indicated, for local harm cannot come save by infection.

DR. DE FOREST WILLARD: I cannot agree with the suggestion to make incisions to relieve the tension. I consider any interference injudicious in slow gangrene. The only safe plan is, to wait for the line of demarcation. Some months since, a man almost moribund came to the hospital with gangrene of the leg, and with crepitation extending as high as the hip-joint. Under excessive stimulation, twenty-four ounces of whiskey daily, he rallied, and I cut away the parts with scissors, through the knee-joint. A quick operation, or one near the part, would have caused death. Recovery has taken place, though a spot is now making its appearance on the toe of the remaining leg.

DR. TYSON: I am very glad to hear Dr. Darrach's remarks. I do not believe that sugar is ever present in normal urine. The copper-reducing substance in such supposed cases is most frequently uric acid.

DR. ASHHURST: The pain of diabetic gangrene so frequently alluded to this evening is, I think, rather a feature of the local process than of constitutional cause. Slow gangrene, especially if, being superficial, it involves a greater extent of nerve distribution, is more painful than rapid or deep-seated gangrene, where the nerves escape to a great extent, or are quickly destroyed. The recommendation to amputate at a very high point in cases of spontaneous gangrene, is by no means new, having been strongly urged many years ago by James, of Exeter; it has been recently revived by Mr. Holmes and other surgeons, but the general consensus of surgical opinion is against it. In traumatic gangrene, of course, the case is different. There the proper course is, I think, to amputate as soon as possible, at a point well above the limit of the gangrenous portion.

GLYCERINE ENEMATA AND SUPPOSITORIES IN CONSTIPATION: BASED ON A TRIAL OF THEM IN 234 CASES.

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[Read November 28, 1888.]

THE treatment of constipation is often one of the most difficult questions which present themselves to the attention of the physician. Undoubtedly hygienic and dietetic measures, or such internal medication as tends eventually to produce natural, regular, and unaided evacuations, form the measures which are most to be sought after. There are, however, cases in which the movement of the bowels is urgently demanded, and no time for any systematic treatment is allowed; and other instances present themselves where, owing to a congenital or acquired utter intractability of the intestines, a palliative treatment, consisting in the periodical artificial production of alvine discharges, is the only course left us.

It is in these two classes that the internal administration of laxative medicine and the employment of rectal injections find their proper sphere. Which of them is to be chosen depends, of course, on the exigencies of the case. Very often, certainly, the enema is greatly to be preferred, since it avoids the general disturbance of the gastro-intestinal tract, and the pain and impaired digestion which may ensue. The employment of large injections of water, with or without soap, turpentine, oil, molasses, etc., is frequently both inconvenient and unpleasant; and it was with considerable pleasure, therefore, that I first noticed the recommendation of glycerine by Anacker.

Further research shows, undoubtedly, that the use of glycerine for this purpose was but an old and largely forgotten custom. I have been unable to discover who first devised this treatment, but I have learned that the late Dr. A. H. Smith, of this city, was constantly in the habit of prescribing injections of it; and his former associate, Dr.

H. A. Slocum,¹ still uses it with success. Dr. William Pepper² has also prescribed it in numerous instances. Eustace Smith³ refers to the value of the injection of from 40 to 60 drops of glycerine in the constipation of infants, and calls it "an old-fashioned plan lately revised;" and Cadogan-Masterman,⁴ while administering a teaspoonful of glycerine, per rectum, to a case of herniotomy, heard the nurse remark: "That was Mr. Warden's favorite plan; he said it was better than all the pills in the world." And this physician, says the writer, died sixteen years ago. Vámosy⁵ searched the German text-books with reference to this matter, but only found that Bernatzik⁶ stated that glycerine had been used as a laxative and antiseptic clyster; that Daude⁷ had given injections of it as a protective and emollient to the mucous membrane of the rectum in dysentery; and that Vogl⁸ recommended it for the same purpose in inflammatory disease of the rectum.

I find the soothing action of glycerine as a local application in dysentery referred to in the *National Dispensatory*, and the drug is also spoken of as a feeble and uncertain laxative; but neither in this work nor in the *United States Dispensatory* is its rectal administration to aid defecation alluded to, and the text-books on *Therapeutics* by Wood, Ringer, Brunton, and Bartholow are silent on the subject. Nevertheless, in Quain's *Dictionary of Medicine*, Oliver, in the article on "Constipation," recommends the injection of a small quantity of glycerine into the rectum.

The history of the present interest in this matter is as follows: A Dutch proprietary medicine, known as "Oidtmann's Purgatif," patented by Dr. Oidtmann, of Maastricht, had attained suprising repute in Holland and Germany for the treatment of constipation. A small metal syringe, holding about 3 to 5 grammes, accompanied the bottle, which contained a grayish-black, slightly greenish fluid, thicker than water, feeling somewhat oily, and having a strong and peculiar odor, which has been compared to that of mouse urine. What was claimed for the preparation it undoubtedly performed; namely, that when about one-half a teaspoonful of it was introduced into the rectum, there was produced a prompt, easy, complete, and painless evacuation.

¹ Personal communication.

² Personal communication.

³ Brit. Med. Journ., vol. II. p. 7, 1888.

⁴ Brit. Med. Journ., vol. I. p. 132, 1888.

⁵ Wien. med. Presse, No. 48, p. 1641, 1887; Therap. Monatsh., March, 1888.

⁶ Arzneiverordnungslehre, vol. II. p. 196.

⁷ Husemann: Arzneimittellehre, vol. I. p. 358, 1874.

⁸ Bernatzik-Vogl: Arzneimittellehre, p. 97.

There was no tenesmus, but a slight sense of irritation of the anus remained for about a quarter of an hour after the movement.

How great a renown the "Purgatif" was obtaining was shown by its widespread employment by the laity, and by the fact that even some physicians were prescribing it, while more than one chemical examination of it was made. Analyses by Birnbaum,¹ Mylius,² Rupp,³ Steensma,⁴ Anacker,⁵ Guldensteenden-Egeling,⁶ and that made by the authority of the *Land-Medicinal-Collegium*⁷ of Saxony, were published; the researches of Guldensteenden-Egeling being particularly careful and exhaustive. Though these differ considerably as regards the nature of the other ingredients, all but that of Mylius agree in declaring glycerine to be the main constituent. This writer simply confesses his inability to discover of what the medicine is composed.

Whether glycerine was also the *active* ingredient could only be determined by clinical experiment, and Anacker,⁸ after a series of trials, found that it was, and that $1\frac{1}{2}$ to 2 grammes of it, introduced into the rectum, acted as quickly and thoroughly as did the "Purgatif." He believes that in this method of employing glycerine we have a valuable addition to our armamentarium, applicable to all cases of constipation, except those in which there is ulceration of the rectum. The action of glycerine he considers due to its hygroscopic qualities. By extracting water from the mucous membrane it produces a hyperæmia of the lower parts of the bowel, and, through the consequent excitation of the nerves, an increased peristaltic action.

A little later than Anacker's paper, and without reference to Oidtman's Purgative, a publication of Unger's⁹ recommended the employment of glycerine in the form of suppositories with soap and *Rhamnus frangula*; and stated that physicians had given them, as thus prepared by him, with very satisfactory results. In an article¹⁰ appearing nearly a year later he changes the formula considerably, while increasing the glycerine and diminishing the soap, as he says that there is no doubt that the former is the active agent. He believes that the glycerine excites the mucous glands to greater secretion, and

¹ Pharm. Centralhalle, No. 22, p. 275, 1887.

² Ibid., No. 6, p. 73, No. 23, p. 235, 1887.

³ Ibid., No. 22, p. 275, 1887.

⁴ het Maandblad voor Apothekers, April, 1887; Pharm. Centralhalle, No. 28, p. 823, 1887.

⁵ Deutsch. med. Wochenschr., No. 37, p. 823, 1887.

⁶ het Maandblad voor Apothekers, June, 1887; Pharm. Centralhalle, No. 28, p. 341, 1887.

⁷ Münch. med. Wochenschr., No. 40, p. 990, 1887; No. 9, p. 148, 1888.

⁸ Deutsch. med. Wochenschr., No. 37, p. 823, 1887.

⁹ Pharm. Centralhalle, No. 42, p. 523, 1887.

¹⁰ Pharm. Centralhalle, No. 16, p. 196, 1888.

repudiates the theory of increased reflex peristalsis, as suggested by Anacker.

Vámosy¹ was induced by the communication of Anacker to administer enemata of glycerine to 150 cases of the most different diseases, varying in age from six to seventy years, all of whom had been constipated for at least two days. A small syringe made for the purpose was employed, and 2 c.cm. (equivalent to 2.5 grammes) of glycerine injected. Evacuation of the bowels followed after one to two minutes, as a rule, and the stools were always soft and formed; no case of a fluid stool being witnessed. Only in rare instances, as in obstinate habitual constipation or where cerebral hemorrhage had occurred, was the evacuation delayed for one-half hour. Defecation was painless, and no uncomfortable sensation remained afterward. It was noticed that the greater the fecal mass in the intestine the more energetic and complete the action of the enema seem to be. The author agrees with Anacker as to the *modus operandi* of glycerine in the rectum. Should pain or burning in the rectum be produced by a too powerful action of the glycerine—as he has heard has occurred in delicate individuals in private practice—he advises that the drug be diluted with one-half its volume of water.

Seifert,² though bitterly opposed to patent medicines, had Oidt-mann's Purgatif so constantly forced on his attention, that he tested its power, and found that it fully met the claims made for it. Having heard of Anacker's discovery of the active constituent, he tried glycerine enemata in 26 cases, besides children, and found that 3.5 cm. at once produced a copious evacuation, without leaving any disagreeable sensation. In no case did he see the drug lose its effect, though sometimes given regularly for many months.

Boas³ has likewise used this treatment in a long series of cases with good results. In patients with hemorrhoids, however, the insertion of any syringe may be productive of pain. At the best, the use of a syringe is not altogether pleasant, is difficult for the patient himself to employ, and cannot always be prescribed in private practice. The author has accordingly devised another form of administration, and has in 20 cases employed hollow suppositories of cacao-butter, each containing 1 gramme of pure glycerine, this dose being found sufficiently large, and acting in fifteen to twenty minutes. He never

¹ Wien. med. Presse, No. 48, p. 1641, 1887; Therap. Montash, No. 40, 1888.

² Münch. med. Wochenschr., No. 9, p. 146, 1888.

³ Deutsch. med. Wochenschr., No. 23, p. 469, 1888.

found it necessary to use more than one suppository, though there would be no objection to giving two.

Kröll¹ also favors the employment of cacao-butter suppositories containing, at least, 2 grammes of glycerine. The evacuation takes place in five to fifteen minutes. He has used them in 50 cases, and with only one failure. While he has often seen glycerine injections produce an unpleasant sensation in the rectum, he has never known the suppositories to have this effect. He considers glycerine especially adapted to cases of constipation from insufficient peristalsis of the large intestine, caused by congestion of the portal system, or occurring in those leading sedentary lives or confined to bed. The treatment does not lose its effect by repetition.

Gerstacker² took careful notice of 55 cases in which he employed enemata of about 2 grammes of glycerine. The results were very satisfactory, defecation taking place shortly after the injection. The average time required was eight and one-half minutes, the shortest two minutes, and the longest six hours. Usually there was but one stool, and this soft; eleven times it was hard, and four times there were repeated evacuations. In no instance was there any unpleasant sensation after the evacuation. The author uses a small metal or glass syringe, to which he attaches a piece of rubber drainage tube one-half metre long. This device he thinks, removes the objection raised by Boas, since the patient can very conveniently and without assistance give himself the injection while lying on the back.

Schindelka³ has had very favorable results with glycerine enemata in 100 horses, 5 grammes always producing an evacuation.

While believing that suppositories have a decided advantage over enemata, Dietrich⁴ considers those recommended by Boas to have the disadvantages of being too large, and of inserting into the rectum too great a proportion of comparatively inert matter. He therefore describes and offers for sale a suppository composed of ninety parts glycerine and ten parts of a hard stearine soap; and says that according to the report from various physicians who have tried them in numerous cases, they produce a natural, easy, and prompt action, the bowels being opened within ten minutes.

Novotny⁵ has administered enemata of $\frac{1}{2}$ to 1 fluidrachm of glycerine to 200 patients with the most diverse diseases, and in all but three or

¹ Therap. Monatshefte, p. 506, November, 1888.

² Therap. Monatshefte, p. 425, September, 1888.

³ Pharm. Centralhalle, No. 16, p. 196, 1888.

⁴ Pharm. Centralhalle, No. 37, p. 445, 1888; Apotheker Zeitung, No. 71, 1888; Pharm. Zeit., No. 71, 1888.

⁵ Gyógyászat. Quoted in Lancet, i. 994, 1888.

four a good stool was produced within a few minutes, though in a few cases two to three hours elapsed. There was not a disagreeable symptom in a single instance. In about a third of the cases a second liquid stool followed the first formed one. He has had a case of obstinate constipation yield almost immediately to this treatment, after having withstood the most powerful purgatives.

Subbotic,¹ after the numerous trials of glycerine by enema, confirms the favorable opinion of others. It was always promptly efficient if the rectum contained feces. When, on the other hand, the rectum was empty, repeated injections failed to induce a passage. He considers that this is entirely in accord with Anacker's explanation, and is a proof that the action of glycerine is confined to the lowest section of the bowel, and that it is unable to stimulate the upper portions to propel the feces downward.

Reisinger² reports his experience with 115 rectal injections of glycerine: 101 were successful, usually in two to fifteen minutes, though the evacuation was sometimes delayed for one to two hours. The cases were of the most different diseases. The stools varied from the consistence of diarrhoea to quite decided solidity. The only unpleasant secondary effects noted were the complaints of slight burning in the anus in 2 cases. Post-mortem examinations were later made on 5 of the cases, but in every instance the mucous membrane of the rectum was found to be destitute of any change which could have been produced by the injections. As regards the manner in which glycerine provokes the evacuations, it is evident it is not through a mechanical irritation, since the injection of an indifferent chemical substance (solution of albumen) had no effect at all. Neither does the author share the views of Anacker, since he found that concentrated solutions of sulphate of sodium introduced into the rectum had no such effect as the glycerine has, though they have the power of abstracting water. It is more probable, therefore, that there exists a direct chemical action of the glycerine on the mucous membrane of the rectum.

Ullmann³ has made a careful, critical study of the effect of glycerine enemata, and the relation of the successful administrations to the disease, the habits of the patients, etc. In the great majority of 174 cases the stools were hard, and in only 7 were they watery. Subsequent constipation was seen in about one-third of the patients. Diarrhoea followed in 6 patients, all of them suffering from tuberculosis.

¹ Centralblatt f. Gynäk., No. 27, 1888.

² Prager med. Wochenschr., 209, May 30, 1888.

³ Centralbl. f. d. gesammte Therap., Aug. 1888.

A slight burning in the anus was not infrequent after defecation, but pain of any moment only occurred in 5 patients. Like Subbotic, he noted the almost invariable failure of the glycerine in cases in which the rectum was empty, and the feces were contained in the bowel above it; and with him believes that the increase of peristalsis is limited to the lower section of the large intestine. He agrees with Unger that the evacuation is due to a profuse hypersecretion produced by the glycerine. He recommends the injections when it is desired to empty the rectum quickly, or when general peristalsis is to be avoided. Their habitual use is improper, as there may be danger of causing inflammation. The amount used was 3 to 6 grammes, and the evacuation generally followed in three to fifteen minutes.

From England comes the report of a trial of glycerine by J. Althaus,¹ who announces his success with it in a large number of his own cases, while several other physicians have told him of their satisfaction with the plan of treatment. The evacuation of the bowels takes place almost immediately, or within a few minutes, and there is no pain or discomfort, unless it be a little throbbing felt in the rectum for a few moments afterward. M. Prowse² states that glycerine is quite effectual when diluted with an equal quantity of water. W. Easby³ cannot speak too highly of it as a laxative enema, having used it frequently of late, though his first trial of it was about two years ago. He gives 1 fluidrachm with a little water in a syringe holding about $\frac{1}{2}$ an ounce. C. J. R. McClean⁴ has employed it by enema in a number of cases with very satisfactory results; using a common glass urethral syringe. J. Bunting⁵ does not find glycerine diluted with water act nearly so well as when pure. C. Palmer⁶ administers it with a syringe in the shape of a small India-rubber ball with a vulcanite nozzle. W. B. Roué⁷ describes, with an illustration, a small graduated glass syringe holding 3 drachms, and adapted for glycerine enemata. The vulcanite nozzle is two inches long, and of sufficiently large bore to admit the easy entrance and exit of the glycerine. G. A. Carpenter⁸ tabulates the results of 214 injections of 1-2 drachms of glycerine in 63 children of from one to eleven years of age. The method was uniformly successful, and in no case did it invariably fail. The enemata are easy of application, prompt in action, and unattended by the slightest discomfort. He considers them superior to the drugs ordinarily employed for constipation.

¹ Brit. Med. Journ., December 24, 1887.

² Ibid.

³ Ibid.

⁴ Ibid.

⁵ Lancet, vol. II. 905, 1888.

⁶ Brit. Med. Journ., I. 449, 1888.

⁷ Brit. Med. Journ., I. 569, 1888.

⁸ Brit. Med. Journ., I. 1281, 1888.

An American report on the rectal use of glycerine as a laxative is that of E. R. Mayer,¹ who has employed enemata of $\frac{1}{2}$ drachm with very general success, and has also used the drug in hollow suppositories of cacao-butter, or enclosed in gelatine capsules. A slight degree of rectal irritation followed the repeated use of the capsules. In a case of painful hemorrhoids enemata of glycerine not only emptied the bowels more thoroughly than compound licorice powder had done, but appeared to give more relief to the pain than all the local treatment previously employed. The author then reports an interesting case of extreme tympanites in peritonitis unrelieved by injection of soap, water, and turpentine, in which 2 fluidounces of glycerine introduced high into the rectum gave great relief by the discharge of a large amount of flatus within twenty minutes, followed later by a fecal evacuation. Contrary to the views of Subbotic, he believes that glycerine has a local action not only on the lower bowel, but that by its peculiar power of diffusing itself it rapidly spreads past the sigmoid flexure to some of the coils of the small intestine. In this way a large amount of fluid is mingled with the feces, and finally a general peristalsis is produced.

I. N. Love,² also, has used glycerine enemata in many cases, and with uniformly satisfactory results; finding it particularly useful in infants and in mothers in whom a constipated habit has persisted after the birth of the child. By giving the injection at the same hour every day the unaided regularity of the bowels may be brought about. In a few cases of hemorrhoids and of severe rectal irritation he had better results with glycerine than with the purgatives and sedative ointments previously used.

The marked success met with in the first few cases in which I used this treatment was reported in a brief note³ published last spring. Since that time the results have continued to be so good, that glycerine enemata or suppositories have largely supplanted other aperient rectal medication in the medical wards under my charge, as well as in other wards of the University Hospital. The collection and preservation of records of cases have been tedious and troublesome, and I am largely indebted in this report to the patient care of Drs. Leidy, Kirby, Wood, and Hay, of the resident medical staff. Up to the time when enumeration had been discontinued there had been 234 cases of constipation, occurring in the most varied medical and surgical diseases, to whom over 530 rectal administrations of glycerine had been given.

¹ Med. News, i, 200, 1888.

² Journ. Amer. Med. Assoc., April 14, 1888

³ Annual Univ. Med. Science, iv, 1887. Article, Glycerine.

When enemata were employed the amount used was usually 1 to 2 fluidrachms, though 1 fluidrachm was generally found sufficient. This was sometimes injected pure, sometimes mixed with a small quantity of water; the effect being much the same in either case. In some instances 20 minims (25 grains) of glycerine were enclosed in a gelatine capsule, and inserted into the rectum, and answered well in many cases. A solid suppository, made by incorporating glycerine with paraffine, was devised by Dr. Leidy, and gave satisfaction in some instances, but required to be kept from moisture, and in a cold place. By far the greatest success with suppositories, however, was obtained with those made with glycerine and soap, which I will presently describe.

The results of the glycerine treatment were most encouraging, as there nearly always followed a full, easy, and painless movement within a few minutes after its employment. The average time required after the enemata was probably five to ten minutes, though the effect was sometimes not evident for fifteen to thirty minutes, and in one case was delayed one and a half hours. Very frequently the evacuation was almost immediate. In a case of convalescent typhoid fever, for example, whose constipation, lasting three and a half days, had not been relieved by an injection of warm water, an enema of one drachm of glycerine produced such an immediate effect that the nurse had hardly turned away from the bed before the patient called for the bed-pan. The thought naturally arises that such prompt results must certainly be due to a strongly irritating action on the mucous membrane of the intestine. I would, however, call particular attention to the fact that this does not appear to be the case. My experience agrees with that of the writers already quoted, that it is rare that pain in the abdomen or rectum, or other symptom of real irritation precedes the evacuation or remains after it, as is so often the case after stimulating aqueous enemata have been used. In a few cases I have recorded a stinging in the rectum attending the injection, or a burning sensation, lasting a few minutes after the bowels were opened. It was found that this did not occur if the glycerine was mixed with a small quantity of water. In a few other instances there was actual rectal pain, due not so much to the action of the glycerine as to the passages of not sufficiently softened feces.

All that has been said regarding enemata of glycerine applies as well to the effects of suppositories, except that the latter require somewhat longer to operate, owing to the time needed for their solution in the bowel. They are also somewhat less certain in their action, on account of the medicament contained in them. Glycerine usually

produces but one stool, and this is soft rather than liquid. It is for this reason that the remedy sometimes fails in obstinate constipation, the very hard scybalous masses not being softened enough. Yet, I am by no means certain that, even in most cases of this kind, soap and water have, as a rule, any superiority, for both the enemata and suppositories of glycerine were often found useful in the enforced constipation following gynecological operations, such as perineorrhaphy, where it was desired that the feces should be soft, and that straining be avoided. There were instances, too, and that not infrequently, in which glycerine produced an easy passage, but in which soap and water either effected no movement at all, or did not soften the scybala sufficiently to prevent painful evacuations. This method of treatment was found particularly valuable in cases in which opium in large doses had been administered during a considerable period. It failed in no such instance, though turpentine with soap and water was often ineffectual. I cannot speak from experience as regards the contra-indication to the use of glycerine in ulceration of the rectum, to which Anacker alludes. The local employment of it in dysentery, already referred to, would indicate that it is not necessarily to be avoided as a laxative when an ulcer exists. I have never seen the drug lose its effect after continued use, and have not found it necessary to increase the dose, nor does there seem to be any tendency to constipation remaining after the treatment is discontinued.

Glycerine is not, of course, an infallible remedy, and, like all other aperients, will sometimes fail utterly, even in cases in which it has been at other times effectual. My experience with it has, however, been sufficiently extended to justify the conclusion that in it we have a safe, prompt, and reliable means of obtaining an evacuation of the bowels; more convenient of employment, and more pleasant to the patient than are large aqueous injections, and certainly superior to them as regards the absence of irritation of the rectum.

Finally, I would again call attention to the administration of the drug in the glycerine and soap suppositories referred to, as an elegant means of exhibiting the remedy in private practice. I have made a somewhat extended trial of these, modelled after those manufactured by Dietrich. Messrs. Henry C. Blair's Sons, apothecaries, of this city, have taken great trouble in perfecting the method of their preparation, and now offer them for sale. 50, 66, and 75 per cent. of glycerine, with soap, was not found reliable. Finally, by using an especially hard castile soap, 90 per cent. of glycerine was incorporated in suppositories weighing 52 grains each, and these were efficient in

the majority of cases. It is to be remembered that the total amount of glycerine in each (46 grains) is not quite two-thirds of that generally used for an enema (viz., 1 fluidrachm, 75 grains). If, therefore, a case does not easily yield to one of them, there would be no objection to giving two at a time. These suppositories are made after the shape recommended by Dr. Dixon,¹ and have according all the advantages peculiar to this form. They are very hygroscopic, but when wrapped separately in tin-foil keep very well, and I can imagine no more elegant method of producing an intestinal evacuation than by their use. Very neat little suppositories for babies, holding 10 or more grains, are also supplied. Mr. James J. Ottinger, apothecary, of this city, has sent me samples of 90 per cent. glycerine suppositories, made with a dry stearine soap, and now offered for sale. He has succeeded in preparing them in such a way that the covering of tin-foil is dispensed with. They are not very hygroscopic, even on exposure to air for some weeks, and present a handsome appearance. I have not myself had any experience with them. Messrs. Parke, Davis & Co, also manufacture 90 per cent. soap suppositories, samples of which they have sent me. I have not yet had the opportunity of trying them.

Though glycerine suppositories are somewhat less certain than are the enemata, yet they are not only much more convenient for private practice, but, owing to their rather slow action, I found them entirely unproductive of discomfort, even in the occasional instances in which the enemata have caused slight burning. The largest rectal gelatine capsules hold not more than 25 grains; an amount too small to be generally useful. Their action is uncertain, and even when two are given at a time, a movement does not occur for thirty to forty minutes. Another objection is that, if sold already filled, they rapidly soften and allow the glycerine to escape. The hollow cacao-butter suppositories are not to be recommended on account of the size required to hold a sufficient quantity of glycerine, and the large amount of inert matter employed. I cannot, therefore, but consider those made with soap the most eligible form.

¹ Therap. Gaz., April, 1888.

A CLINICAL ANALYSIS OF SIXTY-FOUR CASES OF POISONING BY LEAD CHROMATE (CHROME YELLOW) USED AS A CAKE DYE.

By DAVID D. STEWART, M.D.

[A synopsis of a paper read Sept. 14, 1887, and published in full in *The Medical News*, Dec. 31, 1887.]

SUBSEQUENT observation has shown that the 64 cases analyzed form only a modicum of the whole number poisoned by the two bakers—Palmer and Schmidt. The 64 represent those cases of which I had complete histories at the time of the preparation of this analysis in the summer of 1887. All of them had consumed for a considerable period large quantities of the cakes containing chrome yellow, and all displayed unmistakable signs of plumbism.

Lead was found in the urine of all the samples tested by Dr. Leffmann. In the viscera of all of the 5 fatal cases examined by him the metal was found, and in 4 in notable quantities. The saturnine cachexia was present in 78.21 per cent. (50) of the 64 cases, and the remaining 14 exhibited a sallow hue of skin. Emaciation was present in all who had been affected for several months, and in some was marked. Pronounced neurasthenic symptoms, associated with the various phenomena denominated lead cachexia, together with symptoms indicative both of disordered *primæ viæ* and the specific action of the metal on the gastro-intestinal apparatus, in a large number antedated for a considerable period the development of marked symptoms of plumbism. Colic was present in 76.56 per cent. (49), and 60.93 per cent. (39) exhibited all the phenomena of pronounced lead-colic. Frequent vomiting of a greenish-yellow or greenish colored fluid was present in 79.68 per cent. (51) of the 64. It occurred particularly in those affected with colic, though it was a constant symptom in a minority in whom colic was totally absent. Though the symptoms of many of the 64 suggested acute poisoning, it was ascertained by careful inquiry that all had shown at least some slight indications of chronic poisoning prior to the supposed acute outbreak.

Arthralgia, the pains of which were worse at night and totally un-

accompanied by evidences of inflammation, was present in 63.43 per cent. (47), and affected most often and severely the flexor surfaces of the knees and the ankles and the flexor muscles about these joints.

Paralysis of the extensor muscles of the forearm (typical wrist-drop) occurred in only 2 cases. In both it was bilateral and complete. In 3 other cases slight ataxia of these muscles was present, but paralysis did not occur.

Headache was present in 73.43 per cent. (47). In 67.18 per cent. (43) it was of such severity and constancy as to indicate involvement of the intra-cranial structures, although in many of these cases no other symptoms of encephalopathy appeared.

Encephalopathy,¹ manifested by other symptoms besides headache, was present in 23.43 per cent. (15). In 17.18 per cent. (11) it assumed the convulsive form; in 3.12 per cent. (2) the delirious; in 1 case the comatose, and in another a modification of the delirious form, melancholia with accompanying hallucinations and delusions. The convulsive seizures were of the epileptiform type, and were preceded in 10 of the 11 cases for days or weeks by other manifestations of saturninism, such as cachexia, colic, arthralgia, or severe continuous headache, and in at least 5 of these they occurred primarily during or immediately subsequent to an attack of colic and arthralgia. In at least 4 of the 10 cases excruciating cephalalgia preceded their outbreak for several days. The convulsions in all were generalized, severe, and, in several, violent. The duration was longer than that of idiopathic epilepsy, the clonic stage often continuing upward of a half hour, during which the tongue was known to be bitten in at least 6. The intervals in the 8 fatal cases were exceedingly brief, the convulsions rapidly recurring until death took place, in from eight hours to four days. In the fatal cases after the first few seizures consciousness was entirely lost and coma persisted until dissolution. In only 1 of the 11 was I able to discover that an aura preceded the convulsive attack. In this case it preceded three spasms out of several. In 7 of the 11 I ascertained the probable time existing between the first exposure and the appearance of the convulsions, during which lead was constantly ingested. In one it was fifteen days; in another thirty-two days; in a third thirty-three days; in a fourth two and three-fourths months; in a fifth four months; and in a sixth four and two-thirds months;

¹ If 3 of the earlier Palmer cases which terminated fatally were added to these, this percentage would be raised to 26.36, or 18 cases out of 67, and of the eclamptic variety to 20.89 per cent., or 14 cases out of 67. They were undoubted cases of lead convulsions, and are excluded from this analysis only because the lack of detailed history renders them unavailable for statistical purposes.

these were all members of one family. In a seventh it was about two and one-half months. [Histories of several of these cases appear in this and in a preceding paper; *vide The Medical News*, June 18 and December 31, 1887.]

The gums of 89 per cent. (57) of the 64 showed the blue line, and it probably was present in 6 of the remaining 7. In these 57 it was seen in all stages of its development, from a number of bluish-black dots or a faint streak of a similar color, limited to the mucous membrane grasping the neck of a single tooth, to a deep dyeing of the whole labial surface of much retracted and hemorrhagic gums.

Of the five women who exhibited symptoms of plumbism during gestation none aborted. All at full term gave birth to living children. Four¹ of these 5 infants had convulsions within two months after birth, in which 2 died.

The mortality in the 64 cases is 12.5 per cent. The 8 deaths were among the eclamptic cases, making a death-rate in the latter of 72.72 per cent. If in these 8 the 3 were included mentioned in the foot-note on p. 320, the general mortality would be raised to 16.41 per cent., or 11 deaths out of 67, and the mortality in the eclamptic cases would reach 78.57 per cent., or 11 out of 14.

[¹ In the fifth child convulsions also occurred, but at a later period; when it was four months old rachitis developed, paroxysms of laryngismus stridulus were frequent, and death took place in convulsions in the ninth month.]

A FURTHER CLINICAL REPORT, AFTER FIFTEEN
MONTHS, ON FORTY-FOUR OF THE SIXTY-FOUR
CASES OF POISONING BY CHROME YELLOW
USED AS A CAKE DYE.

By DAVID D. STEWART, M.D.

[A synopsis of a paper read December 12, 1888.]

EIGHT of the 64 cases died in convulsions. I have been able to ascertain the later history of all but 12 of the 56 survivors. At the time the data for the analysis of the 64 cases were being collected all of the 44 now reconsidered exhibited some unmistakable and pronounced symptoms of plumbism, such as cachexia, colic, arthralgia, or encephalopathy, and the blue line was present in the gums of all save 1.¹ The health of 44 of the 61 is yet decidedly impaired, and several of the remaining 18 ail slightly. A small minority only of the 44 received any continuous treatment. The lead cachexia is now present in 12. 11 of these have still a blue or purple line in the gum. All of the 12 are markedly anæmic, and pronounced anæmia is present in 1 case in which cachexia is absent. Evidences of functional or organic disease of the heart have appeared in 7 of the 44 since the poisoning. In 6 of the 7 there are decided symptoms of irritable heart. In 3 of the 6 there is, in addition, slight but unmistakable hypertrophy of the left ventricle. The seventh case² illustrates one of the insidious effects of chronic lead poisoning, a tendency toward slow degenerative changes in the vascular system. There was first present irritable heart, which was succeeded by hypertrophy, and that by a chronic mitral valvulitis with insufficiency. Dilated hypertrophy then followed.

Gastric derangement, such as irritability and various dyspeptic conditions, are prominent in a number of the 44, independent of colic. Obstinate constipation is present in 7. A chronic catarrhal enteritis has constantly existed in 1 since his first attack of colic fifteen months

¹ Its absence in this case was due to the non-presence of teeth.

² This case is reported in full in the paper of which this is a synopsis.

ago. Apart from slight colicky pains, which have been frequent in many since the abatement of the more pronounced symptoms of plumbism, colic, having all the characteristics of the typical lead affection, yet occurs in 4. Severe pains about the joints and the muscles in their vicinity are present in 15. In some they have been constant, with exacerbations and remissions; in others they have occurred intermittently every five to thirty days in paroxysms lasting three to ten days. The large joints of the inferior extremities are more frequently affected. The pains are worse at night. Inflammatory appearances have always been absent. Symptoms indicating neuritis are present in several of the arthralgic cases. Complete paralysis of the extensor muscles of the forearm (wrist-drop) occurred in 3 of the 44, and is still present in a slight degree in 2. In 2 others there was slight loss of power in all of the extensors of the fingers and of the wrist, which disappeared without the occurrence of actual paralysis. In 1 of the 44 typical paralysis agitans has developed as the result of the poisoning. This case¹ is of especial interest, because it is generally supposed that although lead may occasionally originate tremor resembling somewhat that of paralysis agitans, the typical shaking palsy of Parkinson does not arise in consequence of metallic poisoning.

Mental and physical depression is a constant symptom in 10. Headache is present in 8 of these who before they were poisoned were free from it. In several it is a diffused, deep-seated ache. In 3 it is severest in the frontal and occipital region. It is now of far less severity than formerly. The urine of 5 of the 8 was examined for albumin. None was present. One of the 5 is pronouncedly melancholic and has delusions of conspiracy. Another, who for months had epileptiform convulsions of undoubted lead origin, now has attacks of subacute mania, and there are present frequent hallucinations of sight and hearing and delusions of persecution. Chorea occurred in 1 of the 8 during the early part of 1888, while cachexia, colic, and the blue line were present. She had never had rheumatism and there was no cardiac disease. The appearance of the gums and teeth in 24 of the 44 is yet indicative of plumbism. A blue line is present in 10; a bluish-purple in 5; and a purple in 9.

In 12 of the 24 there is considerable retraction and atrophy of the free margin of the gum, which is more or less hemorrhagic. Slight friction of this portion causes venous oozing. The crown, neck, and

¹ A detailed report of this case is given in the full paper.

exposed part of the fang surface of the teeth in 9 of the 24 cases is still discolored by lead sulphide, but this staining is far less decided than it was fifteen months ago.

DISCUSSION.

DR. C. K. MILLS: I have made numerous clinical observations on cases of nervous disease and disturbance arising from lead and other metallic poisons, and I am led to the opinion that many of the pains are due to neuritis, that they are not merely neuralgias without discoverable neural lesion. In typical cases we find nerve degeneration either with or without central degenerative lesion.

It is significant, as Dr. Stewart has observed, that his cases of arthralgia did not present the ordinary symptoms of inflammation of the articulations, and we can, therefore, conclude that the pain was not due to true arthritis but to neuritis in joint nerves.

I have seen, from plumbism, a few cases of pseudo-paretic dementia and melancholia of convulsions. I have not seen, though they are on record, cases of so-called Jacksonian epilepsy, menospasm, or unilateral convulsions. Melancholia, too, has arisen from this cause. The general truth seems to be that all metallic poisons and certain infectious diseases act in the same way—that is, the toxic agent is a protoplasmic poison, and different metals or morbid agents may have a selective action for certain tissues. In this way we can account for the diverse manifestations.

The case of paralysis agitans is interesting, and while we must not overlook the possibility of coincidence, yet Dr. Stewart has carefully investigated all the circumstances and appears to have made out his case as well as is possible with our present knowledge. As in some cases of posterior sclerosis neuritis may be present as a coincidence, so here the paralysis agitans may be of other than plumbic origin.

TUMOR PROBABLY OF UTERINE ORIGIN, ATTACHED TO THE SMALL INTESTINE, REMOVED BY LAPAROTOMY.

By JOHN H. PACKARD, M.D.,

SURGEON TO THE PENNSYLVANIA AND ST. JOSEPH'S HOSPITALS.

[Read December 12, 1888]

For the following notes I am indebted to the kindness of Dr. L. I. Blake, resident surgeon to the hospital. It is due to him also that I should acknowledge his skill and attention in dressing and caring for this patient.

Kate M., native of Ireland, aged twenty-six, domestic, single. Admitted to St. Joseph's Hospital November 13, 1888. Family history good. Personal history also good, with the exception of an ill-defined attack she suffered from three years ago, probably resembling in some points the present one, and which was pronounced by her physician at that time to be intestinal inflammation of some sort.

She had been examined by two physicians before admission into the hospital. The first stated that she had inflammation of the womb, while the second led her friends to believe that she was pregnant.

On admission, she stated that she had been suffering for three weeks, getting worse gradually. On examination her abdomen was found to be enormously distended, and exquisitely tender to the touch. Constant pain was felt throughout the greater portion of the trunk. Temperature 101° F.; pulse 100 and moderately strong. There being neither history of traumatism nor marks of violence, a vaginal examination was made, but no abnormalities noted. Her menstruation was established at fifteen, and has always been regular. When pain was sufficiently relieved to permit manipulation of the abdomen, distinct fluctuation was elicited, and in the left ovarian region was an area of dulness, which, though slightly variable, was not obliterated when the patient was turned on the left side. Deep pressure on this spot detected a hard mass which receded from the touch, but returned, the hand being kept in position. Owing to the extreme tension of the abdominal walls it was impossible to ascertain anything as to its nature or attachments.

The tympanites and ascites failing to respond to medicinal agents, the patient growing weaker, and at the end of three weeks the respiration being interfered with, an exploratory incision was decided upon.

The patient being in tolerably fair condition, the operation was performed by Dr. Packard on Saturday, December 8th.

The peritoneum was found to be very much thickened and congested, its appearance being scarcely distinguishable from that of intestine.

After removing five or six quarts of clear serum from the peritoneal cavity, the incision was enlarged, revealing a growth attached to a knuckle of intestine in the lower segment of the abdominal cavity to the left of the median line. This tumor, a little larger than a foetal head, was hard and dense in structure, weighing one and a half pounds; encapsulated and attached by a narrow pedicle, little more than an inch in breadth, which seemed to be a redundant portion of the capsule thrown around almost the entire circumference of the intestine. This was carefully dissected away from the intestine, and all bleeding points ligatured.

The peritoneal cavity was irrigated thoroughly with a solution of the bichloride of mercury, 1 part to 15,000 of distilled water. The peritoneum and abdominal walls were sutured separately, the former with catgut, the latter with silk worm-gut. A glass drainage tube, perforated and closed at the bottom, was placed in Douglas's pouch, and the wound closed and dressed.

The operation was done under full antiseptic precautions. The patient showed considerable shock after the operation, from which she rallied slowly. It was accompanied by persistent vomiting, which was relieved by one drop of creasote every two hours, administered in syrup of vanilla. A peculiar temperature was exhibited during this period, the same thermometer registering successively in the mouth $96\frac{2}{3}^{\circ}$, in the axilla $97\frac{1}{4}^{\circ}$, in the rectum 101° . During the first twenty-four hours there was not sufficient discomfort or restlessness to call for anodynes. Up to this time, about six ounces of bloody serum had been drained from the cavity. Four ounces of warm distilled water were then injected through the tube, and allowed to remain four or five minutes. Since that time, during the last seventy-two hours, not more than three ounces of serum have been removed, and scarcely tinged with blood. A short time after the warm water was removed, the patient complained of sharp, shooting pains, with marked tenderness over the abdomen. These became so severe as to require a suppository of opium (one grain), which soon induced a quiet sleep, with no return of pain on waking.

Thirty-six hours after the operation a slight but persistent cough was developed, probably due to hypostatic congestion, since change of position gave relief.

During the last three days the temperature taken in the mouth has not risen above $100\frac{1}{3}^{\circ}$, the pulse varying from 90 to 100.

Ever since the operation the patient has evinced a strong craving for food, giving milk the preference above anything else.

[The subsequent progress of this case has been very favorable. On the 14th of December (the sixth day) the glass tube was removed, and a soft-rubber one substituted, until the 17th, when it was dispensed with. On this day she had a spontaneous and quite natural movement of the bowels.

Suppuration occurred in the suture tracks, probably from insuffi-

cient preparation of the silkworm-gut used. On the 24th of December (the sixteenth day) she was allowed to sit up in bed, the wound being quite healed.—P.]

DISCUSSION.

DR. OSLER: I agree with Dr. Packard as to the pathological nature of the growth, and the possibility which he mentions is quite well recognized. An interesting feature of the case is the association of peritoneal effusion with solid growths in the abdomen. I have on several occasions been asked to see cases of ascites which depended upon the presence of tumors of ovaries or uterus.

NOTES OF A SUCCESSFUL CASE OF LAPAROTOMY FOR INJURY BY A CIRCULAR SAW.

By JOHN H. PACKARD, M.D.,

SURGEON TO THE PENNSYLVANIA AND ST. JOSEPH'S HOSPITALS, PHILADELPHIA.

[Read December 12, 1888.]

CHARLES B., aged twelve years, was brought to the Pennsylvania Hospital, September 24, 1888, having fallen against a circular saw in rapid motion. The accident occurred about one mile from the hospital.

On his admission, the ascending colon and about two feet of the small intestine were protruding from a wound four inches or more in length, nearly vertical, on the right side of the belly, some two inches from the middle line. The mass was tightly grasped in the wound, so that access of air to the peritoneal cavity was prevented. The boy was in a condition of marked but not excessive collapse.

He was etherized, and the parts antiseptically cleansed. The bowel was then carefully examined. Three wounds of the intestinal wall were detected; one involving the entire thickness, the other two the peritoneal coat only. At several points the omentum had been wounded, and the mesentery was cut in two places. The boy's woollen clothing had been torn by the teeth of the saw, and a great many minute shreds of the stuff deposited on the surface of the protruded mass.

The three intestinal wounds were carefully sutured with very fine silk, after the method of Lembert. All the bleeding points were secured with fine carbolized catgut. Some ragged portions of omentum were similarly tied and cut off. Attention was next given to the cleansing of the peritoneal surface from all the bits of woollen threads deposited on it; a very tedious process, occupying more time than any other part of the operation.

In order to return the protruded mass it was necessary to enlarge the wound somewhat; after which reduction was accomplished without difficulty. After irrigation of the peritoneal cavity, the edges of the wound were brought together with silkworm-gut sutures, secured by shot. A glass drainage tube with a closed and rounded end was inserted, and the usual antiseptic dressings applied, with a flannel over all.

Every two hours the cotton rope filling the tube was removed, and suction was made with a hard-rubber syringe with a long nozzle, so as to prevent any accumulation of secretions.

Reaction took place very favorably; the boy had only very slight pain, but some nausea and vomiting.

The nausea and vomiting continued all next day, subsiding toward evening. A free movement of the bowels occurred, and I learned later that an attendant, just after the boy's admission, had given him by mistake ten grains of blue mass, intended for another patient. As soon as the stomach became quiet, the administration of prepared milk and beef-tea, alternately every two hours, was begun.

On the 28th (the fourth day) there was only a slight yellowish discharge from the tube.

29th. The glass tube was removed, and a soft rubber one substituted for it. Solid food (milk toast) was given.

30th. He ate an egg and some chicken-broth.

A day or two after this the tube was removed, and a few days later the sutures.

For some two weeks after this the boy was kept in bed; he was allowed first to sit up in bed, and then to get up and walk about.

On October 31st, thirty-seven days after the injury, he walked into the clinic-room; and on November 12th he was discharged, with directions to wear a binder for some time, and to report to us before dispensing with it.

I should have mentioned that, after the spontaneous movement of the bowels on the second day, an enema of turpentine and sweet oil was administered about every third day until his dismissal.

Certain features of this case may be briefly commented upon. The boy's youth was, of course, in his favor. He was stout and healthy, although his surroundings had not been, by any means, hygienic. But there was one circumstance of special advantage—the fact that the protruded mass quite filled up and plugged the wound in the abdominal wall. Besides this, the wounds were all of small extent, and no large vessels were divided. The presence of the almost innumerable shreds of soiled woollen clothing on the peritoneal surface was of course an element of danger, only to be set aside by the utmost care and patience in their detection and removal.

It would scarcely be fair to conclude this report without acknowledging the assiduous care and attention, and the skill in manipulation bestowed upon the case by Dr. Walter D. Green, the resident surgeon, who first had charge of it, as well as by his successor, Dr. Harvey Shoemaker. Much of the credit of the favorable result attained belongs fairly to these gentlemen.

[The patient was shown to the Society and examined by the members.]

DISCUSSION.

DR. JOSEPH PRICE: The fact that the protruding intestine completely closed the wound had a great deal to do with the successful result in this case. We know that undue manipulation and prolonged and needless exposure of intestine are frequent causes of shock and death. This fact is beautifully illustrated in needlessly prolonged operations. I never could understand the vicious do-nothing policy of ambulance surgeons in these cases of abdominal incised wounds. The ambulance surgeon should be prepared and instructed to act promptly in such accidents. Promptitude is everything. A pitcher of warm water and a few threads might save lives that are lost by carrying the patient untreated, with the intestines exposed, covered by filthy clothing to the distant hospital, there to wait for the chief to arrive before anything is done.

I recently read of a case of a man who was accidentally eviscerated while hunting alone in the backwoods. Some one found him with the intestines protruding and covered with dirt, and carrying him to the nearest brook, washed and sewed him up. He was also fortunate in *being away from opium* and from meddlesome nurses and officious residents of a general hospital, and he recovered. The strictest simplicity, absence of opium and of milk, indeed of all food till the patient asks for it, except in greatly exhausted cases demanding early support or stimulation, will give the happiest results.

I give plenty of fluids, toast water, barley water, stimulating enemata of beef-tea, with, perhaps, a little whiskey if needed, and enemata of water to relieve thirst.

We know how difficult it is to prevent hemorrhage in ether nausea. Careful preparation for the operation by the free use of salines will minimize the ether and bowel disturbance. I am satisfied that the free use of the salines is of greater importance *before* operation than after in abdominal work. The unintentional administration of blue mass in this case of Dr. Packard's was a happy accident and helped recovery.

I wish particularly to congratulate Dr. Packard upon the excellence of the toilet, the care to secure perfect cleanliness under such difficult conditions, and the perfect drainage. The careful removal of all foreign material from the bowel, free irrigation, and perfect glass drainage in two desperate cases have given him a triumph in two cases of abdominal work.

DR. PACKARD: I must say a word in reply to Dr. Price in defence of "my friend opium." You remove a tumor; all goes well until water is injected into the abdomen. Pain ensues immediately. You give a grain of the extract of opium by the rectum, when the pain disappears, the patient goes to sleep and wakes in comfort. Are you not justified in attributing this to the opium, and relying upon the same measure in similar cases?

Of course, it would be a great mistake to treat all cases of peritonitis with opium. The saline treatment is proper in suitable cases, and saves many lives. So may we say of opium in suitable cases. The error is in exclusiveness, whether in the one direction or the other. We must use our judgment in individual cases, and prescribe in view of all the conditions present.

In this case I think nothing would have served my patient as the one grain of the extract of opium did. It was not a case of peritonitis, however, and I did not so regard it. But suppose some enthusiast in salines had ticketed the case peritonitis and immediately administered purges, I hardly think such prompt relief would have been afforded.

I would like, while on this subject, to mention a measure which I have employed for many years, and which has repeatedly seemed to me to avert threatened peritonitis, and that is, the application of a dozen leeches to the abdomen. After operation for stone especially, as well as in other cases of traumatism, marked benefit has been derived from the adoption of this plan.

CASE OF GUNSHOT WOUND OF THE LUNGS, ILLUSTRATING THE VALUE OF VENESECTION IN TRAUMATIC PNEUMONIA.

By JOHN B. ROBERTS, M.D.

[Read December 26, 1888.]

I DESIRE to report this case and to show the patient, as a contribution to the literature of general bleeding in inflammatory diseases of the lungs. On several occasions I have given my testimony as to the value of phlebotomy in certain conditions associated with idiopathic pneumonia, and, therefore, shall not enter into a full discussion of the topic here. It will be sufficient to report the clinical history of the patient before you.

Three weeks ago this man was shot, at short range, with a revolver carrying a small ball. The bullet passed through the cartilage of the second rib, a little to the left of the sternum. I saw him soon after the injury, and found very little bloody expectoration and dulness over a small area, at the middle of the left chest, behind. This impaired resonance led me to believe that the bullet had traversed the lung, and was located not very far from the posterior surface of the left lung. The wound was dressed aseptically. It was not probed by me, although this had been done to a limited extent by the physician who saw him previously. The patient was ordered digitalis and similar remedies to mitigate the shock. I saw him about twelve hours later, when he was apparently dying of acute inflammation of the left lung, which was evidenced by crepitant râles, and severe congestion of the right lung. The pulse was feeble and intermittent, beating about 120 per minute, the respiration was shallow, counting 70 per minute, the temperature over 101°, the face was cyanosed, and he had great pain, which was referred to the chest. All of these symptoms pointed to an early dissolution. He had been given hypodermic injections of morphia for the purpose of relieving the pain in the chest, but, of course, it did not do so to any great extent.

Realizing the imminent condition of the patient, and having had considerable experience in venesection, I believed that this was an eminently proper case for bloodletting, particularly as the man had previously been strong and healthy. I accordingly bled him from the left arm until the pulse became stronger, slower, and not so intermittent; and until he expressed himself relieved from the great pain in the chest. Respiration at once became less

frequent, falling in a short time to 44 per minute. I paid no attention to the amount of blood drawn, because I was bleeding for the effect upon the pulse and respiration. The blood was afterward measured and was found to be half a pint. The next day the patient was improved, with temperature 99.8°, pulse 76, respiration 24; and from that time he made an uninterrupted recovery. In fact, within forty-eight hours of the bleeding he was practically a well man, sitting up in bed, reading the newspapers, and having normal temperature, pulse, and respiration. I continued digitalis in small doses for a few days merely because I wished him to be taking a placebo, in order to keep him from overexertion. There was a possibility of secondary trouble from hemorrhage; but this never occurred.

This case only illustrates what I have seen occur in cases of traumatic pneumonia due to fracture of the ribs.

A year ago I had a man under my care who had a severe fracture of the ribs and perforation of the lung, followed by pneumonia, who in the same way was relieved of considerable distress by venesection, and who made a quick recovery thereafter. His condition was in no sense as serious as that of the patient whom I show you to-night; it is possible, however, that it might have become so, had I not bled him for incipient pneumonic inflammation.

The cases of idiopathic pneumonia in which I am certain that blood-letting (either from a large vein or possibly from the heart itself by aspiration) is the only means of cure, are those in which the lungs become inundated by profuse mucous exudation, and in which the patient is actually drowned by his own secretions. You will recall cases in which, as a concomitant of lobar pneumonia, the patient becomes cyanosed and moribund, and, on auscultation, presents numerous mucous râles over both lungs. Cupping alone is usually ineffectual to avert death; but general bleeding, done promptly, will relieve the engorgement of the lungs and embarrassment of the heart; and if done early will often result in the recovery of the patient.

I am certain that I have saved the life of one such idiopathic case as I saved this man with gunshot wound. The objection to bleeding is very great in the eyes of many; but cases of traumatic pneumonia occurring in healthy individuals form typical cases for such therapeutic resource, as do the idiopathic cases above mentioned.

I do not desire to be understood to say that I bleed all cases of traumatic pneumonia. At present I have under my care a man with fracture of the ribs, clavicle, and scapula, and who I believe to have inflammation of the lungs; but in his case neither the respiration nor the pulse indicates such engorgement of the pulmonary tissue as would require any such radical measures. Stimulants and tonics in his case

are my only and sole reliance. I believe that he will recover equally with the other case, though not so quickly, the active condition being one of asthenia and pulmonary inflammation following severe injury and shock, and not one of sudden engorgement of the lungs.

When I was called to the gunshot case I was prepared, if there was evidence of the bullet having reached the heart, to open the pericardium and turn out any clots found therein. This is justifiable, I think, even if it becomes necessary to resect the costal cartilages to gain access to the injured parts. Heart suture might even be necessary. The case illustrates the usual non-septic character of gunshot wounds, if the surgeon keeps dirty probes out of the wound.

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